VOLUME 3, NUMBER 3 MARCH 1954

Battelle Technical Review

IN THIS ISSUE:

Technology in Petroleum Conservation

STRUCTURAL ENGINEER

SAMUEL A. GORDON

"Research is most effective when we start with fundamentals. I have found that the best way to develop a structure is to start with the simplest one that will do the job. First you have to understand all the factors in the simple situation. Then changes can be made one by one, adding one unkown factor at a time. If each succeeding factor is understood, the chances are that the final structure will be the right answer to the problem, or close to the right answer."

This philosophy of Samuel A. Gordon reflects his direct approach to problems. It serves him well in his research and evaluation work on all types of structures. Experience with aircraft has led Sam to search for the greatest possible efficiency and economy in structures and marks all his investigations at Battelle. These include a survey of fatigue in helicopter structures, development of design criteria for joints in large-diameter gas pipe, the behavior of various types of complicated structures under load, and other studies. Sam is coauthor of *Fatigue of Materials and Structures*, a forthcoming book by Battelle technologists, prepared for the Airframe Design Division of the Navy Bureau of Aeronautics.

First a structural design engineer with the Chance-Vought Aircraft Company, Sam was later associated with the Convair Aircraft Corporation in the same capacity. Before joining Battelle in 1951, he served as chief structural test engineer for the Glenn L. Martin Company for more than 12 years. In the latter position he played a part in designing and evaluating the A-30, the first low-wing high-speed plane, and in the development of the B-26 and the Martin Mars.

Sam graduated from the Massachusetts Institute of Technology in 1929 with a degree in aeronautical engineering. He is a member of Sigma Xi and the American Society for Testing Materials and an Associate Fellow of the Institute of Aeronautical Science.

With his customary directness of purpose, Sam likes to study compositions for the piano, the more difficult the better. The same quality has made him a crack shot on the target range.

BATTELLE TECHNICAL REVIEW ABSTRACTS

ABSTRACT INDEX

Aeronautical Engineering 127a

Agriculture 128a

Biochemical and Biophysical Research 130a

Ceramics and Concrete 132a

Chemical Engineering 134a

Chemistry—Analytical and Inorganic 136a

Chemistry—Organic 137a

Chemistry—Physical 139a

Coatings 140a

Corrosion 142a

Electrical Engineering 142a

Electrochemistry and Electroprocesses 145a

Electronics 146a

Engineering Economics 148a

Fluid Mechanics 149a

Food Technology 150a

Fuels and Combustion 151a

Geology and Mineralogy 158a

Geophysics 158a

Graphic Arts 159a

Heat Power 160a

Information—Preparation and Dissemination 161a

ABSTRACT INDEX (Continued)

Instrumentation and Laboratory Apparatus 161a

Lubrication and Friction 162a

Mechanical Engineering 163a

Metallurgy 164a

Metals—Extraction and Refining 166a

Metals—Finishing, Polishing, and Cleaning 168a

Metals—Foundry Practice 169a

Metals—Heat Treatment 170a

Metals—Mechanical and Physical Properties 171a

Metals—Mechanical Working 176a

Metals—Metallography, Transformations, and Structures 178a

Metals—Powder 180a

Mining Engineering 180a

Nondestructive Testing 180a

Nuclear Physics, Nucleonics, and Radiation 181a

Operations Research and Management Engineering 183a

Physics 184a

Plastics 187a

Pollution and Wastes 188a

Rubber and Elastomers 188a

Space Heating and Conditioning 189a

Textiles and Fibers 190a

Thermodynamics 191a

Welding and Joining 192a

Wood and Forest Products 194a

BATTELLE TECHNICAL REVIEW ABSTRACTS

Volume 3, Number 3 March 1954

***Asterisks mark items that may be used in the Battelle Library only. None of the unbound materials listed below are available for interlibrary loan.**

AERONAUTICAL ENGINEERING

2792 Range Comparison of Rocket Powered Aircraft. Ralph W. Allen. *Aero Digest*, v. 67, Dec. 1953, p. 30-32, 34, 36, 38, 42.

Despite notorious high fuel consumption, supports theory that rocket aircraft can be practical under proper operating conditions. Graphs, diagrams, photographs. 4 ref.

2793* Design of Military Aircraft. J. H. Kindelberger. *Aeronautical Engineering Review*, v. 12, Dec. 1953, p. 42-49, 125-126.

Discusses design trends of the past 45 years. Diagrams, graphs, photographs.

2794* Evolution of Naval Aircraft, 1911-1954. Lawrence B. Richardson. *Aeronautical Engineering Review*, v. 12, Dec. 1953, p. 50-59, 126-127.

Includes photographs, diagrams.

2795* Design Trends—Guided Missiles. Clark B. Millikan. *Aeronautical Engineering Review*, v. 12, Dec. 1953, p. 82-87, 129-130.

This paper is, of necessity, largely historical in nature in that examples of design problems and solutions are chosen from past and essentially obsolete weapons. Current solutions are discussed only in very general terms. However, even with these limitations, it is hoped that some idea can be given of certain of the major trends and their implications for the future.

2796* Aerodynamics—Theory, Experiment, Application. Hugh L. Dryden. *Aeronautical Engineering Review*, v. 12, Dec. 1953, p. 88-95.

Includes diagrams, photographs.

2797* A Slipstream View of Aircraft Propulsion, 1903-1953. Frank W. Caldwell. *Aeronautical Engineering Review*, v. 12, Dec. 1953, p. 108-117, 131.

Includes diagram, graphs.

2798* Instruments and Control of Flight. Preston R. Bassett. *Aeronautical Engineering Review*, v. 12, Dec. 1953, p. 118-123, 133.

Includes photographs.

2799* Minimal Rocket Trajectories. D. F. Lawden. *American Rocket Society, Journal*, v. 23, Nov.-Dec. 1953, p. 360-367, 382.

Problem of navigation of rocket vehicles between two fixed terminals in space, in such a manner as to minimize fuel expenditure, is analyzed in a general fashion, account being taken of a gravitational field, variable in space, and time. Diagrams. 7 ref.

2800 Straight Wing or Delta For High Speed Flight? Clarence L. Johnson. *Aviation Age*, v. 20, Dec. 1953, p. 36-45.

Discusses basic thrust conditions and wing performance characteristics. Photographs, graphs, diagrams.

2801 Thin, Straight Wings Best Up to Mach 2. *Aviation Week*, v. 59, Dec. 7, 1953, p. 26, 28, 31, 33, 34, 137.

Lockheed engineer says delta or swept wings do not match lift or handling features of straight foil. Photographs, graphs.

2802 Applications of Electricity at Airports. J. E. Carpenter and C. Heyes. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 1, no. 126, Nov. 1953, p. 307-318.

A general review. Diagrams.

2803* A Photographic Technique for the Mensuration and Evaluation of Aerodynamic Patterns. F. N. M. Brown. *Photographic Engineering*, v. 4, 1953, p. 146-156.

Includes photographs.

2804 Battle Birds. Richard Cheney. *Steelways*, v. 9, Dec. 1953, p. 8-11.

Describes current research program in guided missiles. Photographs.

2805 Experimental Stress Analysis of Stiffened Cylinders With Cutouts. Pure Torsion. Floyd R. Schlechte and Richard Rosecrans. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3039, Nov. 1953, 41 p. (TL570 Un3t)

Torsion tests were made on a cylindrical semi-monocoque shell of circular cross section. Diagrams, graphs, photographs, tables. 5 ref.

2806 Use of Two-Dimensional Data in Estimating Loads on a 45° Sweptback Wing With Slats and Partial-Span Flaps. Lynn W. Hunton and Harry A. James. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3040, Nov. 1953, 40 p. (TL570 Un3t)

Estimated loads including local pressure distributions, span loadings, and nonlinear local lift characteristics are compared with similar results measured at large scale on a 45° sweptback wing of aspect ratio 6 having a 0.4-span double-slotted flap both with and without a full-span slat. Graphs, tables, photograph, diagrams. 7 ref.

2807 Summary of Revised Gust-Velocity Data Obtained From V-G Records Taken on Civil Transport Airplanes From 1933 to 1950. Walter G. Walker. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3041, Nov. 1953, 16 p. (TL570 Un3t)

Re-evaluation was made on basis of a "derived" gust velocity which is related to "effective" gust velocity by a conversion factor that is a function of the type of airplane and operating altitude. Graph, tables. 9 ref.

2808 Effect of Rapid Blade-Pitch Increase on the Thrust and Induced-Velocity Response of a Full-Scale Helicopter Rotor. Paul J. Carpenter and Bernard Fridovich. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3044, Nov. 1953, 26 p. (TL570 Un3t)

General equations have been derived for the ensuing motion of the helicopter. Calculations and experimental results are in good agreement for various rates of pitch increase of 6 to 200° per sec. Graphs, photographs, diagram. 3 ref.

Aeronautical Engineering

2809 Theoretical Calculations of the Effects of Finite Sideslip at Supersonic Speeds on the Span Loading and Rolling Moment for Families of Thin Sweptback Tapered Wings at an Angle of Attack. Windsor L. Sherman and Kenneth Margolis. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3046, Nov. 1953, 53 p. (TL570 Un3t)

Completes presentation of results obtained from a general investigation of effects of slideslip on aerodynamic characteristics of thin sweptback tapered wings with side edges parallel to the axis of wing symmetry. Graphs, diagrams, table. 6 ref.

2810 Impingement of Water Droplets on NACA 65A004 Airfoil and Effect of Change in Airfoil Thickness From 12 to 4 Percent at 4° Angle of Attack. Rinaldo J. Brun, Helen M. Gallagher, and Dorothea E. Vogt. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3047, Nov. 1953, 45 p. (TL570 Un3t)

Amount of water in droplet impinging on the airfoil, area of droplet impingement; and rate of droplet impingement per unit area on the airfoil surface were calculated from the trajectories and presented to cover a large range of flight and atmospheric conditions. Graphs, tables. 7 ref.

2811 Gust Loads and Operating Airspeeds of One Type of Four-Engine Transport Airplane on Three Routes From 1949 to 1953. Walter G. Walker. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3051, Nov. 1953, 34 p. (TL570 Un3t)

About 50,000 hours of V-G data are analyzed to determine magnitude and frequency of occurrence of gust loads and gusts. Graphs, tables. 14 ref.

2812 The Effect of Vertical Chine Strips on the Planning Characteristics of V-Shaped Prismatic Surfaces Having Angles of Dead Rise of 20° and 40°. Walter J. Kapryan and George M. Boyd, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3052, Nov. 1953, 38 p. (TL570 Un3t)

Wetted lengths, resistance, and center-of-pressure location were determined at speed coefficients up to 25.0, load coefficients up to approximately 80.0, and trims up to 30°. Graphs, photograph, diagrams, tables. 5 ref.

See also:
3536 (jet engines)
3594 (aircraft lubricants)
4042 (automatic assembly line for jet engines)
4071 (acoustics of airplanes in supersonic flight)
4144 (molded aircraft wings)

AGRICULTURE

2813* *iso*Thiocyanates. II. Volatile *iso*Thiocyanates in Seeds and Roots of Various *Brassicae*. III. The Volatile *iso*Thiocyanates in Seeds of Rape *(Brassica napus L.)*. Kai Arne Jensen, Josef Conti, and Anders Kjaer. **IV. A Systematic Investigation of the Occurrence and Chemical Nature of Volatile *iso*Thiocyanates in Seeds of Various Plants.** (English.) Anders Kjaer, Josef Conti, and Ivan Larsen. *Acta Chemica Scandinavica*, v. 7, no. 9, 1953, p. 1267-1283.

Discusses compositions as determined by chromatography and spectrochemical analysis. Graphs, chromatograms, spectra, tables. 42 ref.

2814* Bacterial Fertilizers? K. Starr Chester. *Agricultural Chemicals*, v. 8, Dec. 1953, p. 32-33, 116, 118.

Analyzes Russian claims of discovery of method of making insoluble minerals available to plants. Photographs, table. 10 ref.

2815* Progress in Plant Chemotherapy. A. E. Dimond. *Agricultural Chemicals*, v. 8, Dec. 1953, p. 34-35, 123, 125.

Reviews therapeutants, theories, and operations. 22 ref.

2816* Chemical Control of Golden Nematode. Joseph F. Spears. *Agricultural Chemicals*, v. 8, Dec. 1953, p. 52-54, 111, 113.

Includes photographs.

2817 Response of Spring Barley Varieties to Different Fertilizer Treatments and Seasonal Growing Conditions. J. W. Pendleton, A. L. Lang, and G. H. Dungan. *Agronomy Journal*, v. 45, Nov. 1953, p. 529-532.

Includes graphs, tables. 6 ref.

2818 Fertility Erosion on Two Wisconsin Soils. H. F. Massey, M. L. Jackson, and O. E. Hays. *Agronomy Journal*, v. 45, Nov. 1953, p. 543-547.

Discusses selective removal of soil fertility constituents by erosion. Graphs, tables.

2819* Effects of Skin Coatings on the Behaviour of Apples in Storage. III. Cool Storage Investigations. E. G. Hall, S. M. Sykes, and S. A. Trout. *Australian Journal of Agricultural Research*, v. 4, Oct. 1953, p. 365-383 + 1 plate.

Work was done with Granny Smith and Jonathan varieties. Coatings tested included alcoholic solutions of castor oil and shellac, oil emulsions, and wax emulsions. Tables, graph. 14 ref.

2820* The Control of Sucker Growth in Tobacco by Growth Substances and Mineral Oils. J. Calvert. *Australian Journal of Agricultural Research*, v. 4, Oct. 1953, p. 390-402 + 2 plates.

Includes graphs, tables. 15 ref.

2821* Bare-Patch Disease and Associated Problems in Subterranean Clover Pastures in South Australia. W. V. Ludbrook, J. Brockwell, and D. S. Riceman. *Australian Journal of Agricultural Research*, v. 4, Oct. 1953, p. 403-414 + 3 plates.

Three diseases new to subterranean clover pastures have been observed in the Coonalpyn Downs, South Australia. *Rhizoctonia solani* is shown to cause "bare patch" and *Meloidogyne marioni* of "root-knot patch". The third disease, "unthriftiness" is a complex problem. Table. 12 ref.

2822* The Effect on Cattle of Long-Continued Cutaneous Applications of DDT. W. I. Roulston, L. F. Hitchcock, A. W. Turner, and A. D. Campbell. *Australian Journal of Agricultural Research*, v. 4, Oct. 1953, p. 470-480.

Experiment was carried out near Brisbane and another near Melbourne to determine hazard of long-continued cutaneous applications of DDT to cattle. Graphs, tables. 17 ref.

2823* The Importance of Legumes in Dairy Pastures. R. E. Hodgson. *Better Crops With Plant Food*, v. 37, Nov. 1953, p. 13-16, 40-43.

Legumes in pasture mixture are helpful in maintaining a higher yield of forages and a higher protein, calcium, and phosphorus content in the forages throughout the grazing season. Photographs, tables.

2824* Boron—Important to Crops. Arthur L. Prince. *Better Crops With Plant Food*, v. 37, Nov. 1953, p. 17-19, 44-46.

Present-day research on boron now leans toward fundamental studies on function of the element in the plant, and mechanisms involved in its fixation and availability in soils. 27 ref.

2825* Conditioning Soils in the Southwest. Richard M. Marshall. *Better Crops With Plant Food*, v. 37, Nov. 1953, p. 22-24, 50-51.

Discusses need for the farmer to understand soils and their treatment, to prevent erosion and keep them productive Photographs.

2826* The Fungicidal Activity of Substituted Acetanilides and Related Compounds. N. G. Clark and A. F. Hams. *Biochemical Journal*, v. 55, Dec. 1953, p. 839-851 + 1 plate.

Includes photograph, tables. 24 ref.

2827* Biochemical Changes in Ripening Soy Beans Under Influence of Calcium and Manganese. (Russian.) A. P. Shcherbakov. *Biokhimiia*, v. 18, no. 4, July-Aug. 1953, p. 438-447.

Yield is affected not by Ca alone but by proportion of Ca to Mn. Tables. 11 ref.

2828* Test of Chemical Control of Meadow Weeds. (Russian.) A. V. Voevodin. *Botanicheskii Zhurnal*, v. 38, no. 4, July-Aug. 1953, p. 575-578.

A preparation of 2.4-D was used with an OP-7 substance to increase toxicity of the herbicide against weeds resistant to 2.4-D. Tables. 21 ref.

2829* Factors Associated With the Fungitoxicity of Ferbam and Nabam. Richard M. Weed, S. E. A. McCallan, and Lawrence P. Miller. *Boyce Thompson Institute, Contributions*, v. 17, Oct.-Dec. 1953, p. 299-315.

By labeling these fungicides with S^{35}, studies were made on nature and effectiveness of their decomposition products. Diagrams, tables. 21 ref.

2830 Insect Population Balance and Chemical Control of Pests. The Use of Selective Insecticides. R. M. Greenslade. *Chemistry & Industry*, 1953, no. 46, Nov., p. 1223-1224.

Discusses ways of increasing selectivity of insecticides to prevent destruction of beneficial insects. Table. 4 ref.

2831* Malathion. Effective New Foe of Insects. *Chemurgic Digest*, v. 12, Nov. 1953, p. 12-13.

One of the safest insecticides to handle, Malathion is ideally suited for fly control in critical areas where flies congregate but where a relatively non-toxic material is required. Table.

2832* Peanut Hulls for Growing and Fattening Cattle. C. M. Kincaid and H. R. Thomas. *Chemurgic Digest*, v. 12, Nov. 1953, p. 15.

Experiments described explore possibilities of using peanut hulls in growing and fattening rations of yearling beef cattle. Table.

2833* The Green Bandit. Don Duane Fadely. *Crops & Soils*, v. 6, Dec. 1953, p. 10-11.

Varietal resistance to greenbugs is tested by placing the insects among varieties of small grain. Photographs.

2834* Natural Rubber. U. S. Farmers Can Grow It. H. M. Tysdal and R. D. Rands. *Crops & Soils*, v. 6, Dec. 1953, p. 16-17.

With improvements in varieties, methods of culture, and methods of processing made during the past few years, it is safe to say that the U. S. can produce a reasonable amount of its own natural rubber in an emergency. Photographs.

2835* Effect of Vapors of Methyl Ester of 2,4,5-Trichlorophenoxyacetic Acid on Tomato Fruit Pulp Formation. (Russian.) Iu. V. Rakitin and A. V. Krylov. *Doklady Akademii Nauk SSSR*, v. 90, no. 4, June 1, 1953, p. 681-683.

Stimulated growth was observed in plants growing in a protected soil. Tables. 5 ref.

2836* The Influence of Phosphorus Food Supply Conditions on Composition of Soy Beans. (Russian.) V. B. Bagaev. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 961-964.

With a continuous supply of P an increase in production of nucleoproteins was noted. Exclusion of phosphorus leads to a large accumulation of Phytine and sugar-like phosphates. Tables. 7 ref.

2837* Influence of Monovalent and Bivalent Cations on Formation of Lyophilic Colloids in Plant Cells and Tissues. (Russian.) M. S. Zhukov. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 169-172.

Discusses variation of lyophilic colloid content in plants caused by proportion of monovalent to bivalent cations in the food supply solution. Tables. 13 ref.

2838* Structure and Physiological Activity of Certain Substitutes of Phenoxy Alkyl Carbonic Acid on Plants. (Russian.) N. N. Mel'nikov, R. Kh. Turetskaia, and K. S. Bokarev. *Doklady Akademii Nauk SSSR*, v. 90, no. 5, June 11, 1953, p. 921-923.

Studies of the activity were conducted on bean stalks. Tables. 2 ref.

2839* Possibility of Combining Biological and Chemical Methods in Control of Agricultural Plant Pests. (Russian.) A. T. Sysoev. *Doklady Vsesouznoi Ordena Lenina Akademii Selbskokhoziaistvennykh Nauk, Imeni V. I. Lenina*, v. 18, no. 7, July 1953, p. 26-31.

Discusses method of protecting beneficial insects while controlling diseases and other insects. Tables.

2840* Test on Chemical Control of the Destructive Eurygaster in Forests. (Russian.) D. M. Paikin and P. F. Mende. *Doklady Vsesouznoi Ordena Lenina Akademii Selbskokoziaistvennykh Nauk, Imeni V. I. Lenina*, v. 18, no. 8, Aug. 1953, p. 18-20.

Best results were obtained from Spring application of a solution of "thiophos" concentrate in water and methane sulfofluoride in green oil.

2841* Application of Protopectinase Bacteria in Agricultural Technics. (Russian.) K. I. Rudakov and M. R. Birkel. *Doklady Vsesouznoi Ordena Lenina Akademii Selbskokhoziaistvennykh Nauk, Imeni V. I. Lenina*, v. 18, no. 9, Sept. 1953, p. 10-15.

Use of *Bacillus polymyxa* preparations increased percentage of water resistant compounds in legumes. Tables.

2842* Influence of Time of Limestone Application on Yield of Perennial Grasses. (Russian.) V. F. Skvortsov. *Doklady Vsesouznoi Ordena Lenina Akademii Selbskokhoziaistvennykh Nauk, Imeni V. I. Lenina*, v. 18, no. 9, Sept. 1953, p. 22-25.

Discusses results of application made before seeding. Tables. 6 ref.

2843* Spot Applications of Fertilizer for the Castor Plant. (Russian.) I. S. Kudashev. *Doklady Vsesouznoi Ordena Lenina Akademii Selbskokhoziaistvennykh Nauk, Imeni V. I. Lenina*, v. 18, no. 9, Sept. 1953, p. 26-32.

Describes methods of application. Tables, photographs.

2844* Simultaneous Use of Herbicides and Insecticides During Cultivation of Cereal Crops. (Russian.) A. V. Voevodin. *Doklady Vsesouznoi Ordena Lenina Akademii Selbskokhoziaistvennykh Nauk, Imeni V. I. Lenina*, v. 18, no. 9, Sept. 1953, p. 33-35.

Airplane dusting and spraying with various preparations are described. Tables. 4 ref.

2845* Scientific Problems of Fertilizing Plants to Increase Productivity. (Russian.) T. D. Lysenko. *Dostizheniia Nauki i Peredovogo Opyta b Sel'skom Khoziaistve*, 1953, no. 11, Nov., p. 22-36.

Applications of lime and fertilizer are discussed. Studies were made of microorganisms in acid soils. Table.

2846* Control of Grain Crop Pests in the Non-Black Earth Strip. (Russian.) I. M. Beliaev. *Dostizheniia Nauki i Peredovogo Opyta b Sel'skom Khoziaistve*, 1953, no. 11, Nov., p. 43-46.

Applications of hexachlorane for insect control and herbicides for weed control are described. Tables.

2847* Fruit Insects. *Farm Chemicals*, v. 116, Dec. 1953, p. 41.

Presents brief summary of fruit insect conditions in the Northeast in 1953.

2848* Carbamate Herbicides. Evaluation of Three Carbamate Herbicides in Comparison With Isopropyl *N*-(3-Chlorophenyl) Carbamate. Donald H. Moore, Donald K. George, Vaughn O. Martin, and John A. Garman. *Journal of Agricultural and Food Chemistry*, v. 1, Dec. 9, 1953, p. 1154-1158.

Describes experimental studies on cotton, soybeans, green beans, oats, crabgrass, and chickweed on three types of soil. Photographs, tables, graph. 15 ref.

2849* Feed Supplements. Genus *Bacillus* as a Source of Growth Stimulants. J. C. Lewis, Kosuke Ijich., T. F. Sugihara, P. A. Thompson, N. S. Snell, Gordon Alderton, and J. A. Garibaldi. *Journal of Agricultural and Food Chemistry*, v. 1, Dec. 9, 1953, p. 1159-1163.

Describes experimental studies on chicks to determine effectiveness of above. Diagram, tables. 13 ref.

Agriculture

2850* Enzymes. Course of Action of Polygalacturonase on Polygalacturonic Acids. Rolland M. McCready and Elizabeth A. McComb. *Journal of Agricultural and Food Chemistry*, v. 1, Dec. 9, 1953, p. 1165-1168.

Includes tables, graphs, diagrams. 24 ref.

2851* The Activity of Organic Acids as Germination Inhibitors and Its Relation to pH. A. M. Mayer and M. Evenari. *Journal of Experimental Botany*, v. 4, Sept. 1953, p. 257-263.

Includes tables, diagrams. 9 ref.

2852* A Germination Inhibitor From Sugar-Beet. P. C. De Kock, R. F. Hunter, and I. R. MacDonald. *Journal of Experimental Botany*, v. 4, Sept. 1953, p. 272-282.

Discusses extraction of unsaturated oil from sugar beet seed balls. Describes experimental investigation of its inhibiting activity. Diagram, tables, graphs. 22 ref.

2853* The Effects of Certain Growth-Regulating Substances on the Rhizomes of *Aegopodium podagraria*. N. G. Ball. *Journal of Experimental Botany*, v. 4, Sept. 1953, p. 349-362.

Includes graphs. 8 ref.

2854* Elementary Corpuscles of Onion Mosaic Virus. (Russian.) V. A. Smirnova. *Mikrobiologiia*, v. 22, no. 5, Sept.-Oct. 1953, p. 572-576 + 1 plate.

Observations of X-bodies in the epidermis of onion virus disclosed fine circular particles which diffracted light. Micrographs, table. 17 ref.

2855* Growth Stimulators. (Russian.) Iu. V. Rakitin. *Nauka i Zhizn*, v. 20, no. 7, July 1953, p. 8-11.

Describes various chemicals which stimulate or retard growth of plants and color or ripen fruits and vegetables. Photographs.

2856* Antibiotics in Agriculture. (Russian.) A. Z. Smolianskaia. *Nauka i Zhizn*, v. 20, no. 9, Sept. 1953, p. 9-10.

Describes use of antibiotics for treating plant diseases and as growth stimulants. Photographs.

2857* Cooperative Tests of Seed-Treatment Chemicals on Spring Wheat and Oats in 1953. R. W. Leukel. *Plant Disease Reporter*, v. 37, Dec. 15, 1953, p. 587-594.

Includes tables.

2858* Effects of Terramycin on Peach Trees Affected With Bacterial Spot. John C. Dunegan, R. A. Wilson, and W. T. Morris. *Plant Disease Reporter*, v. 37, Dec. 15, 1953, p. 604-605.

Includes table. 5 ref.

2859* Acid-Base Conditions for the Formation of Dissolved Organic Compounds of Manganese. (Russian.) I. P. Serdobol'skii and M. G. Siniagina. *Pochvovedenie*, 1953, no. 8, Aug., p. 42-50.

Conditions for formaton of Mn compounds with various acids were studied by polarographic methods. Tables, graphs. 8 ref.

2860* Use of Carbon Dioxide as Fertilizer in Greenhouses. (Russian.) I. E. Rogalev. *Sad i Ogorod*, 1953, no. 10, Oct., p. 17-21.

Describes results of vegetation tests and industrial experience. Photograph, tables.

2861* Autumn Prophylactic Measures for Control of the Cobweb Tick on Cucumbers. (Russian.) A. S. Gurlev and E. M. Platonova. *Sad i Ogorod*, 1953, no. 10, Oct., p. 21-22.

Discusses use of NIUIF-100 and formalin. Photograph.

2862* Measures to Protect Gardens From Mice-Like Rodents. (Russian.) B. Iu. Fal'kenshtein. *Sad i Ogorod*, 1953, no. 10, Oct., p. 62-64.

Describes poisonous and non-poisonous bait preparations.

2863* Tolerance of Certain Higher Plants to Chronic Exposure to Gamma Radiation From Cobalt-60. Arnold H. Sparrow and Eric Christensen. *Science*, v. 118, Dec. 4, 1953, p. 697-698.

Includes table. 5 ref.

2864* Radioactive Tracers in Insecticide Research. Paul A. Dahm. *Soap and Sanitary Chemicals*, v. 29, Dec. 1953, p. 167-168, 175.

A review. Diagram. 30 ref.

2865* The Control of Flowering. Three Decades of Research. Eric Ashby. *Times Science Review*, 1953, Winter, p. 6, 8.

A general review. Photographs, diagrams.

2866* The Effects of Organo-Mercurial Fungicides on Sugar Cane Cuttings. *World Crops*, v. 5, Dec. 1953, p. 497-498.

Discusses practice of treating cane sets with disinfectants prior to planting as a precaution against fungus diseases in general and Pineapple disease in particular. Photographs. 5 ref.

2867* Disinfestation of Ships' Holds. *World Crops*, v. 5, Dec. 1953, p. 499-500.

Describes method which consists of the application of insecticides with mechanical fog generators. Photographs.

2868* High Periodic Applications of Nitrogen Fertilizer. II. Field Tests on Winter Wheat. (German.) H. Linser and E. Primost. *Zeitschrift für Pfanzenernährung Düngung Bodenkunde*, v. 63, no. 1, 1953, p. 18-30.

Results show increased wheat yield. Optimum amount of fertilizer varies. Tables. 10 ref.

2869* The Effect of Soft Crude Phosphates in Open Field Experiments. (German.) Ed. Hofmann and A. Amberger. *Zeitschrift für Pfanzenernährung Düngung Bodenkunde*, v. 63, no. 1, 1953, p. 38-45.

Comparative experiments with Thomas phosphate and soft North-African crude phosphates reveal that the former is more effective in alkaline soils while the latter is more effective in acid soils. Tables. 4 ref.

Books and Miscellaneous Publications

2870 Fertilizer Technology and Resources in the United States. v. III. K. D. Jacob, editor. 454 p. 1953. Academic Press Inc., New York. (TP963 J15f)

Contains "Fertilizer Technology in a Changing World", Ralph W. Cummings; "Nitrogen Production Facilities in Relation to Present and Future Demand", George V. Taylor; "Conversion of Ammonia to Fertilizer Materials", M. F. Gribbins; "Chemical and Physical Properties of Nitrogen Materials and Their Sphere of Usefulness", Eugene D. Crittenden; "Phosphate Resources and Processing Facilities", K. D. Jacob; "Chemistry and Manufacture of Superphosphates and Phosphoric Acid", H. B. Siems; "Chemistry and Technology of New Phosphate Materials", J. H. Walthall; "Potash Resources in the United States in Relation to World Supplies", J. Fielding Reed; "Production and Processing of Potassium Materials", G. T. Harley; "Resources and Processing of Materials Carrying Calcium, Magnesium, and Sulfur", Henry A. Huschke; "Mechanics of Mixed-Fertilizer Production", Ritchie P. Taylor; "Physical and Chemical Problems in Mixed-Fertilizer Production", Joseph A. Chucka; "High-Analysis Mixed Fertilizers", Maurice H. Lockwood; and "Special Fertilizers, Special Uses for Fertilizers, and Nonfertilizer Sources of Plant Nutrients", A. L. Mehring.

See also:
2871 (fungicidal properties of trisphenols)
3022 (micro determination of Cu in soils)
3032 (possible animal sources for fatty acids)
3295 (economics of agriculture)

BIOCHEMICAL AND BIOPHYSICAL RESEARCH

2871 Preparation and Bacteriostatic Properties of Substituted Trisphenols. David J. Beaver, Roland S. Shumard, and Paul J. Stoffel. *American Chemical Society, Journal*, v. 75, Nov. 20, 1953, p. 5579-5581.

Describes preparation of 17 new trisphenols. Their physical properties and bacteriostatic activity against two types of bacteria and one fungus are shown. Tables. 15 ref.

2872* The Diatom Genus *Tabellaria*. III. Problems of Infra-Specific Taxonomy and Evolution in *T. flocculosa*. Brenda M. Knudson. *Annals of Botany*, v. 17, new ser., Oct. 1953, p. 597-609.

Includes diagrams, graphs. 11 ref.

2873* Genetic Studies on Microbial Cross Resistance to Toxic Agents. II. Cross Resistance of *Micrococcus pyogenes var. aureus* to Thirty-Four Antimicrobial Drugs. Waclaw Szybalski. *Antibiotics & Chemotherapy*, v. 3, Nov. 1953, p. 1095-1103.

Includes tables. 25 ref.

2874* The Action of Some Water-Soluble Poly-α-Amino Acids on Bacteria. E. Katchalski, L. Bichowski-Solmnitzki, and B. E. Volcani. *Biochemical Journal*, v. 55, Nov. 1953, p. 671-680.

Includes graphs, tables. 36 ref.

2875* The Assimilation of Amino Acids by Bacteria. XVIII. The Incorporation of Glutamic Acid Into the Protein Fraction of *Staphylcoccus Aureus*. XIX. The Inhibition of Phenylalanine Incorporation in *Staphylcoccus Aureus* by Chloramphenicol and *p*-Chlorophenylalanine. E. F. Gale and Joan P. Folkes. *Biochemical Journal*, v. 55, Dec. 1953, p. 721-735.

Includes graphs, tables. 30 ref.

2876* Biological Properties of Amino Derivatives of Ptero-Glutamic Acid and Its Homologs. (Russian.) V. A. Kirsanova and A. V. Trufanov. *Biokhimiia*, v. 18, no. 4, July-Aug. 1953, p. 484-489.

Testing of various compounds on lactic acid organisms indicated that 4-NH_2 ptero-glutamic acid hinders growth of organisms. Tables, graphs. 7 ref.

2877 Biochemistry of the Ustilaginales. IX. The β-*D*-Cellobioside Units of the Ustilagic Acids. R. U. Lemieux, J. A. Thorn, and H. F. Bauer. *Canadian Journal of Chemistry*, v. 31, Nov. 1953, p. 1054-1059.

Two *D*-glucose residues in the two main components of ustilagic acid mixture are shown to be present as β-*D*-cellobiopyranoside units. Tables. 15 ref.

2878 Studies of *Aspergillus niger*. II. Transglycosidation by *Aspergillus niger*. S. A. Barker and T. R. Carrington. *Chemical Society, Journal*, 1953, Nov., p. 3588-3593.

Includes tables.

2879* Relative Bactericidal Efficiencies of Three Types of High-Energy Ionizing Radiations. S. A. Goldblith, B. E. Proctor, S. Davison, B. Kan, C. J. Bates, E. M. Oberle, M. Karel, and D. A. Lang. *Food Research*, v. 18, Nov.-Dec. 1953, p. 659-677.

Includes graphs, photographs, diagram, tables. 12 ref.

2880* Influence of Gram-Negative Bacteria on the Sauerkraut Fermentation. R. C. Fulde and F. W. Fabian. *Food Technology*, v. 7, Dec. 1953, p. 486-488.

Presents study concerned with enumeration and identification of organisms that normally appear at the beginning of sauerkraut fermentation. Diagram, graphs, table. 5 ref.

2881* Observations on Fresh Meat Processed by the Infusion of Antibiotics. H. H. Weiser, H. S. Goldberg, V. R. Cahill, L. E. Kunkle, and F. E. Deatherage. *Food Technology*, v. 7, Dec. 1953, p. 495-499.

Possibility of processing fresh meat by infusion of whole animals before dressing out was explored. Tables, photographs, graphs. 10 ref.

2882* Heatless Sterilization. I. David M. Ashkenaz. *Glass Packer*, v. 32, Dec. 1953, p. 26-28.

Background facts for production and packaging men on history of sterilization and an appraisal of currently used physical methods. (To be continued.)

2883* Nonpharmaceutical Uses of Antibiotics. *Journal of Agricultural and Food Chemistry*, v. 1, Nov. 25, 1953, p. 1096-1102.

Future of nonpharmaceutical uses of antibiotics is one of expanded use through research and development. Photographs, graphs, diagram, table.

2884* Fermentation. Oxygen Uptake in Shake-Flask Fermentations. Ping Shu. *Journal of Agricultural and Food Chemistry*, v. 1, Nov. 25, 1953, p. 1119-1123.

Because of the importance of oxygen as a substrate in fermentation, a shake-flask fermentor was designed, in which uptake of oxygen during a fermentation is recorded automatically. Diagrams, graphs, photograph. 10 ref.

2885* Variation of Growth in Successive Experiments With Folic Acid-Deficient Chicks and the Influence of Aureomycin. George M. Briggs, Mattie Rae Spivey, and Ligia O. Ortiz. *Journal of Nutrition*, v. 51, Nov. 10, 1953, p. 355-367.

Results presented show that dietary aureomycin may depress growth of folic acid-deficient chicks under certain conditions, and also demonstrates that severity of a folic acid deficiency may be influenced by factors other than composition of diet. Tables. 22 ref.

2886* Nitrogen Balance of Adult Rats Fed Amino Acid Diets Low in L-, DL- and D-Tryptophan. E. S. Nasset and Margaret T. Ely. *Journal of Nutrition*, v. 51, Nov. 10, 1953, p. 449-461.

Experiments described represent an attempt to discover minimum quantity of tryptophan required to maintain N balance, under rigidly controlled conditions, in the adult rat. Tables, diagram. 9 ref.

2887* The Effect of Antibiotics on the Growth of Chicks Raised in New Quarters. C. H. Hill and J. W. Kelly. *Journal of Nutrition*, v. 51, Nov. 10, 1953, p. 463-466.

Much higher levels of aureomycin were needed to produce increased growth in new or thoroughly sterilized pens. Tables. 5 ref.

2888* Influence of Carbon Dioxide on the Growth of Mold Fungus. (Russian.) S. A. Barinova. *Mikrobiologiia*, v. 22, no. 4, July-Aug. 1953, p. 391-398.

In small concentrations CO_2 stimulates growth of many microorganisms. In large amounts it becomes a strong poison. Tables. 11 ref.

2889* Significance of Carbon Dioxide for the Activity of Mold Fungus. I. Concerning the Possibility of Replacement of Carbon Dioxide by Organic Acids. S. A. Barinova. *Mikrobiologiia*, v. 22, no. 5, Sept.-Oct. 1953, p. 497-505.

Atmospheric CO_2 accelerated growth of various molds in acid media. Tables. 26 ref.

2890* Luminescent-Microscopic Observations of Formation and Secretion of Riboflavin by the Microscopic Fungus *Eremothecium Ashbyii*. (Russian.) E. M. Dikanskaia. *Mikrobiologiia*, v. 22, no. 5, Sept.-Oct. 1953, p. 525-529.

Natural luminescense of this vitamin presents possibility of investigating its formation process and later reactions in living organism. 11 ref.

2891* An Effective Antiseptic Against Acid Forming Bacteria. (Russian.) S. A. Konovalov. *Mikrobiologiia*, v. 22, no. 5, Sept.-Oct. 1953, p. 559-565.

Use of sodium pentachloro phenolate is described. Tables. 5 ref.

2892* Effect of Quaternary Ammonium Compounds on Yeast Under Various Conditions. (Russian.) L. I. Komarova. *Mikrobiologiia*, v. 22, no. 5, Sept.-Oct. 1953, p. 566-571.

Concentrations of 0.005% bromide cetyl pyridinium and cetyl aphyrole are shown to be effective in inhibiting infection of yeast fermentation. Tables, graphs. 2 ref.

2893* Sorbic Acid as a Mold Inhibitor. Donald P. Smith and J. Norbert Rollin. *Modern Packaging*, v. 27, Dec. 1953, p. 139-141, 184.

New, approved, non-toxic, fungistatic additive for food-wrapper coatings. Photographs, tables.

2894 Heterosis in Saccharomyces. Carl C. Lindegren, J. Edgar Braham, and Juan De Dios Calle. *Nature*, v. 172, Oct. 31, 1953, p. 800-802.

Includes tables. 5 ref.

Biochemical and Biophysical Research

2895 The Immune-Adherence Phenomenon. Robert A. Nelson, Jr. *Science*, v. 118, Dec. 18, 1953, p. 733-737.

Describes an immunologically specific reaction between microorganisms and erythrocytes leading to enhanced phagocytosis. Photomicrograph, graph, tables. 10 ref.

2896* Techniques of Research. III. Phase-Contrast Microscopy. R. Barer. *Times Science Review*, 1953, Winter, p. 8-9.

A review of principles and applications to biological research. Diagrams, graphs.

Books and Miscellaneous Publications

2897 Quantitative Pharmaceutical Chemistry. Glenn L. Jenkins, John E. Christian, and George P. Hager. 4th Ed. 534 p. 1953. McGraw-Hill, New York. (RS421 J41q4)

Covers general, special, and physicochemical methods used in official pharmaceutical analyses.

See also:
2984 (yield of alcohol during yeast fermentation)
4199 (microbiological protection for cellulose)

CERAMICS AND CONCRETE

2898 Application of the Laws of Chance to Problems Involving Defects in Optical Glass. I. Bubbles. John C. Young. *American Ceramic Society Bulletin*, v. 32, Dec. 1953, p. 407-412.

Studies were made to determine how bubbles in a melt of glass will probably be redistributed after glass has been processed into lens elements. Tables, diagrams, graphs.

2899 Differential Thermal Analysis of Titania-Opacified Enamels. Frederick D. Olympia. *American Ceramic Society Bulletin*, v. 32, Dec. 1953, p. 412-414.

Differential thermal analysis is adapted to study of titania-opacified enamels with relation to degree of nucleation; rate, amount, and crystal modification of the crystallite growth; and enameling techniques that enhance physical properties of enamel. Table, thermograms. 5 ref.

2900 Recent Developments in Tunnel Kiln Firing in the Heavy Clay Industry. Edward L. Harcourt and Richard J. Reed. *American Ceramic Society Bulletin*, v. 32, Dec. 1953, p. 417-420.

Includes photographs, graph, diagrams.

2901 The Polymorphism of Cordierite. M. D. Karkhanavala and F. A. Hummel. *American Ceramic Society, Journal*, v. 36, Dec. 1953, p. 389-392.

During the course of a broader investigation on cordierite-spodumene join in the system Li_2O-MgO-Al_2O_3-SiO_2, a clearer picture of relationships between various reported polymorphs of cordierite has been developed. Graphs, tables. 12 ref.

2902 Reactions in the System Li_2-MgO-Al_2O_3-SiO_2: 1. The Cordierite-Spodumene Join. M. D. Karkhanavala and F. A. Hummel. *American Ceramic Society, Journal*, v. 36, Dec. 1953, p. 393-397.

Phase equilibria along the nonbinary join between cordierite ($2MgO \cdot 2Al_2O_3 \cdot 5SiO_2$) and spodumene ($Li_2O \cdot Al_2O_3 \cdot 4SiO_2$) were investigated in temperature range 800 to 1550 C using quench technique on fourteen compositions. Tables, graphs.

2903 Uranium Oxide Phase Equilibrium Systems: IV. UO_2-ThO_2. W. A. Lambertson, M. H. Mueller, and F. H. Gunzel, Jr. *American Ceramic Society, Journal* v. 36, Dec. 1953, p. 397-399.

UO_2 and ThO_2 form a continuous series of solid solutions with solidus-liquidus extended from 2875 C for UO_2 to above 3200 C for ThO_2. Graphs, tables, photograph. 6 ref.

2904 Some Effects of Titania on Refractory Clays. David R. Wilder and C. M. Dodd. *American Ceramic Society, Journal*, v. 36, Dec. 1953, p. 400-403.

Amount of titania a clay can contain without appreciably lowering its refractoriness was determined. Tables, graphs. 15 ref.

2905 Metal-Ceramic Interactions: II. Metal-Oxide Interfacial Reactions at Elevated Temperatures. G. Economos and W. D. Kingery. *American Ceramic Society, Journal*, v. 36, Dec. 1953, p. 403-409.

Interfacial reactions of various metals (Be, Mo, Nb, Ni, Si, Ti, and Zr) with dense oxide specimens (Al_2O_3, BeO, MgO, ThO_2, and TiO_2) were investigated at temperatures up to 1800 C. Photographs, tables, micrographs. 30 ref.

2906 Dependence of Ultimate Strength of Glass Under Constant Load on Temperature, Ambient Atmosphere, and Time. Derald A. Stuart and Orson L. Anderson. *American Ceramic Society, Journal*, v. 36, Dec. 1953, p. 416-424.

Paper develops several equations that relate average strength of glass under constant load to duration of test, temperature of test, and ambient atmosphere. Diagrams, graphs, tables. 14 ref.

2907 A Study of Glass Refractories. W. L. Fabianic. *Brick & Clay Record*, v. 123, Dec. 1953, p. 46-49.

Describes composition and performance of various types of glass tank blocks. Tables.

2908 Some Properties of Pyrophyllite As a Refractory Raw Material. William C. Bell, Irving W. Gower, and John R. Hart. *Brick & Clay Record*, v. 123, Dec. 1953, p. 62-63, 65-66.

Includes graphs, tables. 3 ref.

2909 The Rehydration of Fired Clay and Associated Minerals. R. D. Hill. *British Ceramic Society, Transactions*, v. 52, Nov. 1953, p. 589-612; disc., p. 612-613.

Kaolinite, illite, montmorillonite, vermiculite, bauxite, and limonite were fired at temperatures between 500 and 1,150 C and then rehydrated in saturated steam at 200 C for periods up to 96 hrs. Products formed as result of firing and rehydration were examined by X-ray and differential thermal analysis. Extent of rehydration was studied as a function of firing temperature. Graphs, micrographs, tables. 11 ref.

2910 The Effect of Heat on Plaster. A. Dinsdale. *British Ceramic Society, Transactions*, v. 52, Nov. 1953, p. 614-629; disc., p. 629-631.

Account is given of experiments on rate of dehydration of plaster under various conditions of temperature and humidity. Effect of dehydration on strength is shown. Results are related to crystal structure and vapor pressure data. Conditions normally prevailing in pottery dryers are discussed. Graphs, tables. 6 ref.

2911* Improvment of Clay by Preheating. Jack A. Cunliffe. *British Clayworker*, v. 62, Nov. 1953, p. 242, 244.

Reviews some literature. Presents advantages of preheating clays, such as improvements in extruding and drying.

2912 Correlation of Particle Size Distribution With Firing Shrinkage in a Ceramic Whiteware Composition. William A. Contardi and George J. Hund. *Ceramic Age*, v. 62, Nov. 1953, p. 13-16.

An investigation was made to correlate particle size distribution with firing shrinkage. Graphs, tables.

2913* Local Reduction Copper Reds. Edgar Littlefield. *Ceramic Monthly*, v. 1, Dec. 1953, p. 16-18.

Describes history, compositions, and application techniques for Cu red glazes. Photographs, tables.

2914 Ceramics for High Temperature Applications. Alexander Pechman. *Ceramic Age*, v. 62, Nov. 1953, p. 27-31, 34.

Turbojets, gas turbines, ramjets, and rockets have created a demand for materials which will withstand elevated temperatures and vibration and possess good resistance to thermal shock. Ceramic materials seem to offer the best promise of providing these desirable characteristics. Photographs, tables. 5 ref.

2915 Plant Design and Layout. III. Roy S. Arrandale. *Ceramic Industry*, v. 61, Nov. 1953, p. 64-66.

Includes graphs. 5 ref.

2916* Glaze Defects From Faulty Bisque. Their Causes and Cures. Joseph A. Burns. *Ceramic Industry*, v. 61, Dec. 1953, p. 82.

2917* Triaxial Test Offers Glaze Control Method. F. Carlton Ball. *Ceramic Industry*, v. 61, Dec. 1953, p. 84-85, 124.

Includes graphs, tables.

2918* Symposium on Kilns—Their Design, Operation, Firing and Future Trend. *Claycraft*, v. 27, Nov. 1953, p. 65-73; disc., p. 74-78.

Includes "Speaking From the Refractories Angle", T. C. Edwards; "Generalities in Kiln Design and Working", C. E. Moore; "Kiln Construction", F. Harwood; "Continuous Kilns", L. H. Brant; "Application of Top-Fired Stokers to Continuous Kilns", V. T. Chesswas; "Insulation", K. W. Cowling; "The Operation of Rectangular Downdraught Intermittent Kilns of the Pressure Type for Red Bricks", A. A. Thompson; and "The Use of Underfeed Stokers on Intermittent Kilns", F. W. Wright.

2919* Reaction of Ta_2O_5 With B_2O_3 and the Structure of $TaBO_4$. (Russian.) A. I. Zaslavskii and R. A. Zvinchuk. *Doklady Akademii Nauk SSSR*, v. 90, no. 5, June 11, 1953, p. 781-783.

Monocrystals of Ta_2O_5 were extracted from B_2O_3 fusion. Hexagonal tablets with strong birefringence were obtained. Table, diagram. 5 ref.

2920* Application of the Reciprocal Polishing Method in the Study of Glasses. (Russian.) V. D. Kuznetsov. *Doklady Akademii Nauk SSSR*, v. 90, no. 4, June 1, 1953, p. 537-540.

Studies were made of glasses of varying composition. Tables, graph. 3 ref.

2921* Retention in Quartz Crystals. (Russian.) E. V. Tsinzerling. *Doklady Akademii Nauk SSSR*, v. 90, no. 5, June 11, 1953, p. 785-786.

Discusses quick return to previously shaped crystalline form. Micrographs.

2922* Optical Constant of Elasticity of Glass Under High Pressures. (Russian.) G. M. Bartenev. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 523-526.

Photoelasticity can be used as a material constant for determining stresses and calculations of strength of hard glasses. Diagram, graphs, micrographs. 9 ref.

2923* Chemical Composition of M. V. Lomonosov's Stained Glasses. (Russian.) M. A. Bezborodov and V. L. Chenakal. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 609-611.

Seven specimens of 18th century colored glasses were analyzed. Gold ruby, soda-lime, and lead glasses were included. Tables. 4 ref.

2924* Sintering of Amorphous Bodies. (Russian.) Ia. E. Geguzin. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 45-48.

Studies were made on glass to determine agreement with Frankels' theory. Photograph, graphs.

2925 Glass in the Electronic Industry. M. Manners. *Electronic Engineering*, v. 25, Dec. 1953, p. 512-516.

Glasses available to electronic industry are summarized. Applications for which they were developed are described. Photographs, tables. 3 ref.

2926* Physical and Chemical Aspects of the Composition of Glass. Elmar Umblia. *Glass*, v. 30, Nov. 1953, p. 507-511.

Presents a general discussion including effect of network formers and modifiers, lowered melting temperature, replacement of B_2O_3, and reduction of crystallization tendency of hard glass. Tables. 9 ref.

2927 Electric Annealing and Auxiliary Heating in the Glass Industry. II. J. Horowitz. *Glass Industry*, v. 34, Dec. 1953, p. 663-666.

Design, construction, and operating characteristics of kilns and continuous lehrs are discussed. Photograph, diagrams. 5 ref.

2928 Plant Layout and Design. Summary of a Glass Conference Paper. Roy S. Arrandale. *Glass Industry*, v. 34, Dec. 1953, p. 667-673, 686.

Discusses selection of pipe sizes for fluids encountered in a glass plant. Graphs.

2929* First All-Glass Aerosol Pack Unveiled. *Glass Packer*, v. 32, Dec. 1953, p. 21-23, 50.

Zonite's ultra-low pressure system allows use of standard weight uncoated bottle for alcohol-base packs. Photographs.

2930* Printing on Glass Parenteral Drug Containers. L. H. Zahn. *Glass Packer*, v. 32, Dec. 1953, p. 32, 52.

Printing directly on glass ampuls has a number of advantages, but not all the difficulties have yet been overcome.

2931 Steel Mill Refractories and Masonry. II. *Industrial Heating*, v. 20, Nov. 1953, p. 2283-2284, 2286, 2288.

Discusses methods of open-hearth slag and flue dust removal and advantages of monolithic refractories in furnace spouts.

2932 Ceramics Research at Oak Ridge National Laboratory. *Industrial Heating*, v. 20, Nov. 1953, p. 2294, 2296.

In addition to its program of fundamental and applied research projects the ceramic department performs services for other research departments at Oak Ridge National Laboratory. Photographs.

2933 Metals in the Atomic State in Glasses. W. A. Weyl. *Journal of Physical Chemistry*, v. 57, Nov. 1953, p. 753-756; disc., p. 756-757.

Interaction between glasses and metal atoms and aggregation of metal atoms in glasses as result of heat treatment or irradiation are described. 14 ref.

2934 An Electromagnetic Viscometer for Molten Silicates at Temperatures Up to 1800°C. J. O'M. Bockris and D. C. Lowe. *Journal of Scientific Instruments*, v. 30, Nov. 1953, p. 403-405.

By use of an electromagnetic method of torque measurement, it has been found possible to cover the range 0·05-14,000 poises without modification of apparatus. An accuracy of ± 0·5% has been obtained at room temperature. Diagrams. 7 ref.

2935* Mineralogical Calculations of Basic Refractory Materials. III. (Hungarian.) Arisztid Cser. *Kohaszati Lapok*, v. 8, no. 8, Aug. 1953, p. 176-184.

A collection of detailed tables is presented. Importance of calculations for manufacturing technology is outlined 9 ref.

2936* Soviet Methods of Alumina Production. (Hungarian.) Béla Lányi. *Magyar Kémikusok Lapja*, v. 8, no. 11, Nov. 1953, p. 314-318.

Describes Shuhov-Kuznetsov method based on electrical melting of bauxite with lime; Iakovkin and Lilev-Mazel process based on lima-soda sintering; Peniakov process based on sintering bauxite with Na_2SO_4 in presence of coal; production from nepheline, alunite, and potassium aluminate slag; and combinations of the above. Tables.

2937* Present Trends in Selecting and in Technology of Refractory Materials. (Italian.) Felice De Carli. *Metallurgia italiana*, v. 45, no. 9, Sept. 1953, p. 317-322.

Includes tables, micrographs, graph.

2938* Building-Stone Can Last Longer. (Russian.) A. Svetov. *Nauka i Zhizn*, v. 20, no. 7, July 1953, p. 36.

Effects of treating surfaces with potash alum solutions are discussed.

2939* The Effect of the Quality of Bentonite and of the Specific Surface of Sand Upon the Strength Values of Mixtures From Bentonite and Molding Sand. (Hungarian.) János Barna and Zoltán Juhász. *Öntöde*, v. 4, no. 11, Nov. 1953, p. 226-233.

Proposes a new theory for bonding of two types of Hungarian bentonites. Describes possibilities for application of both. Interaction between properties of bentonite and specific surface of the sand are outlined. Tables, graphs, micrographs. 21 ref.

2940* New Basalite Produced at Napa Junction Plant, 700 Cubic Yards Per Day. Harry F. Utley. *Pit and Quarry*, v. 46, Dec. 1953, p. 76-80.

"New Basalite" an expanded shale lightweight aggregate now being produced in volume from new plant of Basalt Rock Company, Inc., Napa Junction, Calif. Photographs.

Ceramics and Concrete

2941* A Modern New Silica Refractories Plant. *Pit and Quarry,* v. 46, Dec. 1953, p. 91-94.

Harbison-Walker Refractories Company's new silica refractories plant, which incorporates latest features of design, processing, and equipment known to that industry. Photographs, diagram.

2942* Sintering of Shales to Produce Lightweight Aggregate for Concrete. W. C. Scott, Jr. *Pit and Quarry,* v. 46, Dec. 1953, p. 98-100, 116.

Studies of utilization of shales for production of lightweight concrete aggregate have resulted in development of a sintering process for production of lightweight aggregate. Diagrams, tables, photographs.

2943* Glass Fiber. (Polish.) Z. Bielawski and A. Zawadzki. *Przemysl Chemiczny,* v. 9, no. 8, Aug. 1953, p. 394-400.

Surveys modern methods of production. Presents fiber properties, treatment, and application. Diagrams, graphs, tables.

2944* Metallising Non-Metallic Surfaces. *Product Finishing,* v. 6, Nov. 1953, p. 74-78, 110.

Article briefly reviews five main methods at present available for use with ceramics, glass, and plastics. Tables.

2945* Refractories for the Basic Open Hearth Furnace. A. McKendrick. *Refractories Journal,* v. 29, Nov. 1953, p. 455-464.

Discusses performance of various types of refractories. Tables.

2946* Refractories in the Service of Industry. D. Dixon. *Refractories Journal,* v. 29, Nov. 1953, p. 470-472.

General discussion of improvements in insulating bricks, crucibles, and porcelain tubes. Photograph.

2947 Night-Seeing Qualities of Heat-Absorbing Glass. W. F. Sherman. *SAE Journal,* v. 61, Dec. 1953, p. 44-45.

Based on secretary's report of "Round Table on Heat-Absorbing Glass" held under the auspices of the SAE Passenger Car Activity at the SAE Summer Meeting June 10, 1953.

2948* Lining of Pig Iron Mixers. (German.) Christian Bruchhausen. *Stahl und Eisen,* v. 73, no. 23, Nov. 5, 1953, p. 1453-1457.

Presents a comparison of mixers. Discusses life of lining, mechanical wear at mouth and discharge openings, and insulation. Describes jointless masonry and grinding of magnesite bricks. Table, graphs, photographs.

2949* Lining of an 800 Ton Pig Iron Mixer With Dolomite Bricks. (German.) Karl Mayer, Fritz Gareis, Sigismund Kienow, Helmut Knüppel, and Gerhard Trömel. *Stahl und Eisen,* v. 73, no. 23, Nov. 5, 1953, p. 1457-1462.

Discusses trials with Halden dolomite bricks to descrease mixing and labor costs. Describes resistance to slag and mechanical attack. Table, photographs, micrographs.

2950* Lining an 800 Ton Pig Iron Mixer With Chemically Bound Magnesite Bricks. (German.) Karl Mayer and Helmut Knüppel. *Stahl und Eisen,* v. 73, no. 23, Nov. 5, 1953, p. 1463-1468.

Discusses laying chemically bound bricks without mortar. Describes wear and formation of "cat's heads". Life of lining was better than with burned magnesite bricks. Photographs, graph, diagrams. 5 ref.

2951* Investigation of Cooling Sheet Glass in the Vertical Drawing Machine. (Russian.) N. A. Zakharikov and M. I. Korobko. *Steklo i Keramika,* v. 10, no. 7, July 1953, p. 3-8.

Influence of various factors on cooling the sheet in a chamber under the machine and in the pit was studied. Tables, graphs.

2952* Problem of Improving the Properties of Sanitary-Ware Slip by Using a Combined Peptizer. (Russian.) G. V. Kukolev and L. A. Shchukareva. *Steklo i Keramika,* v. 10, no. 7, July 1953, p. 15-16.

Discusses use of peptizers for improving slip properties. Tables. 8 ref.

2953* Investigation of Properties of Arctic Tuff Lava From the Point of View of Its Possible Application as a Partial Substitute for Refractories. (Russian.) R. L. Pevzner. *Steklo i Keramika,* v. 10, no. 7, July 1953, p. 19-20.

Properties of various natural minerals were determined. Table.

2954* Some Data on Quality of Window Glass. (Russian.) M. R. Savitskii. *Steklo i Keramika,* v. 10, no. 7, July 1953, p. 28-30.

Describes various parameters of tested glass. Tables.

2955 Vermiculite. O. S. North and H. P. Chandler. *U. S. Bureau of Mines, Information Circular* 7668, Oct. 1953, 27 p. (TN21 Un3i)

Discusses mining, milling, exfoliation, uses, production, consumption, and prices. Describes properties and domestic and foreign deposits. Tables. 136 ref.

2956* Identification of Clays by Means of Phosphate Fixation and Cation-Ion Exchange. (German.) U. Schoen. *Zeitschrift für Pflanzenernährung Düngung Bodenkunde,* v. 63, no. 1, 1953, p. 1-17.

Heating of samples to 500 and 1000 C was found to increase phosphate fixation by kaolinite and halloysite. Heating of iron oxide hydrate and iron silicate reduces phosphate fixation. Tables, graphs. 36 ref.

See also:

3088 (porcelain enameling)
3121 (coated tools for enameling furnaces)
3648 (carbon refractories)
3666 (carbon linings for blast furnaces)
3734 (properties of molding sand)
4096 (oxygen vacancies in BaO)
4143 (glass fabrics)
4257 (soldering on ceramics)

CHEMICAL ENGINEERING

2957* Optimum Blowing Steam Rate in Deodorization and Steam Distillation. L. D. Chirgwin, Jr. *American Oil Chemists' Society, Journal,* v. 30, Dec. 1953, p. 583-586.

Paper proposes to show that, technologically, there is an optimum blowing steam rate characteristic of each individual system and rates above this optimum actually lessen degree of deodorization. Graphs. 5 ref.

2958* Effects of Certain Variables on the Continuous Solvent Extraction of Vegetable Oils. Lionel K. Arnold and Robert S. P'Pool. *American Oil Chemists' Society, Journal,* v. 30, Dec. 1953, p. 611-613.

Preliminary investigations have been carried out on continuous countercurrent extraction of soybeans by trichloroethylene. Graphs, photographs.

2959 Savings Possible Through the Use of the Ufer Process in Benzol Plant Light Oil Washing. J. P. Purdy. *Blast Furnace and Steel Plant,* v. 41, Dec. 1953, p. 1451-1452, 1463, 1466.

Describes equipment, plant layout, methods used, and advantages of Ufer process. Diagrams, tables.

2960 Starting-Up a Phosphoric Acid Plant. Sven Nordengren and Rolf Nordengren. *Chemical Age,* v. 69, Nov. 21, 1953, p. 1063-1067.

2961 Alginates: Colloids From Seaweed. R. W. Moncrieff. *Chemical Age,* v. 69, Nov. 21, 1953, p. 1075-1078.

Alginates are chemicals of considerable and growing importance, derived entirely from seaweed. Photographs.

2962 Phosphoric Acid by the Wet Process. P. Fleury. *Chemical Age,* v. 69, Nov. 28, 1953, p. 1121-1122.

Describes manufacturing process which appears feasible on basis of pilot plant tests.

2963 New Technique for Vapor Separation. *Chemical Engineering,* v. 60, Dec. 1953, p. 344, 346-348.

Novel method hinges on "filtration" of the more diffusible component through a gas. It comes in handy when distillation is not feasible. Diagrams.

2964 Kinetics of Catalytic Cracking of Cumene. T. E. Corrigan, J. C. Garver, H. F. Rase, and R. S. Kirk. *Chemical Engineering Progress*, v. 49, Nov. 1953, p. 603-610.

A silica-alumina catalyst was used in a fixed-bed integral reactor. Data for conversion vs. reciprocal space velocity curves were obtained at 850, 950, and 1050 F. Graphs, diagrams. 13 ref.

2965 Filtration Resistance of Compressible Materials. W. L. Ingmanson. *Chemical Engineering Progress*, v. 49, Nov. 1953, p. 577-584.

An equation was derived and corroborated by experimental data. Diagrams, graphs, tables. 23 ref.

2966* A Mathematical Interrelationship Concerning the Liquid-Film Coefficient in the Exchange of Matter in Towers With Sprayed Ring-Packings. (German.) Georg Kling. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 557-565.

Nondimensional equations having analogy to heat transfer are given for exchange of matter between gases and liquids in spray towers. Diagrams, graphs, tables. 25 ref.

2967* Air Instead of Water for Cooling and Condensation. (German.) F. Schulenberg. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 569-573.

Discusses development of air-cooled heat exchangers. Photographs, graphs. 4 ref.

2968* Performance of Thin-Layer Evaporators With Forced Films. (German.) Walter Hauschild. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 573-574.

Practical experiences are presented. Diagram, table, graphs.

2969* Investigations of the Rectification of Different Mixtures in Packaged Towers at Atmospheric Pressures and Underpressures. (German.) Emil Kirschbaum and A. David. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 592-594.

Presents summary of studies carried out with four binary mixtures which were rectified in a 100 mm diameter packed tower at pressures between 50 and 750 mm Hg. Graphs. 3 ref.

2970* Definition of Degree of Exchange of Rectification Plates in the Case of Mixtures of Two and Three Substances. (German.) Helmuth Hausen. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 595-597.

Definition is given which can be independently taken in relation to steam or to liquid and which can be determined from equilibrium. Graphs, diagram. 4 ref.

2971* The Present State of Large-Scale Oxygen Production. (German.) Ernst Wittmann. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 601-606.

Presents review and critical comparison of different methods of oxygen production in large-scale industry. Graphs, tables, diagrams.

2972* Influence of Contraction on the Drying Process. (German.) F. Kneule and H. Schlachter. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 617-619.

Equation for drying speed of non-hydroscopic substances which show a contraction and change on the surface while drying. Table, graphs. 7 ref.

2973* The Two-Substance Diffuser in Spray Drying. (German.) E. Turck. *Chemie-Ingenieur-Technik*, v. 25, no. 10, Oct. 1953, p. 620-622.

Compares practical experiences with atomizing disks, discharge diffusers, and two-substance diffusers. Discusses influence on particle size. Diagrams, graph. 3 ref.

2974* Role of Coal and Aluminum Silicate During Polymerization of Olefins With Gaseous Boron Fluoride. (Russian.) Ia. M. Paushkin and L. I. Shcherbakov. *Doklady Akademii Nauk SSSR*, v. 90, no. 5, June 11, 1953, p. 795-797.

Polymerization occured at atmospheric pressure. Temperature was controlled by a rheostat and a galvanometer with a thermocouple. Table. 5 ref.

2975* Reacton of the Formation of Al_2TiO_5 in a Solid Phase. (Russian.) V. A. Bron. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 825-827.

Discusses possibility of producing Al_2TiO_5 by a reaction in the solid phase at comparatively low temperatures. Graphs, table. 9 ref.

2976* Phase Composition of Certain Calcium-Chromium Slags and Particularly the Characteristic Water-Soluble Calcium in Them. (Russian.) D. S. Biliankin and V. V. Lapin. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 911-914 + 1 plate.

Various Cr containing slags were investigated. Micrograph, tables. 6 ref.

2977 Application of Computing Machines to Ion Exchange Column Calculations. Ascher Opler. *Industrial and Engineering Chemistry*, v. 45, Dec. 1953, p. 2621-2629.

Includes graphs, tables. 26 ref.

2978 Molecular Distillation Apparatus With Great Separating Power. W. G. Aldershoff, H. Booy, S. L. Langedijk, G. Th. Philippi, and H. I. Waterman. *Institue of Petroleum, Journal*, v. 39, Oct. 1953, p. 688-694.

Nine stages of vaporization and condensation are provided in which liquid phase is transferred from stage to stage by mechanical means. In this way, separating power of the still is greatly increased compared with that of single-stage apparatus. Diagrams, tables.

2979 Chemical Engineering. IV. Transfer of Heat. D. C. Freshwater. *Institute of Petroleum Review*, v. 7, Nov. 1953, p. 369-377.

Discusses general principles, condensation of vapors and boiling liquids, heat exchangers, condensers, and re-boilers. Tables, diagrams. 3 ref.

2980* An Automatic Refinery. Harold Hawkins. *Instrumentation*, v. 7, no. 1, 1953, p. 29-31.

Describes refinery which features continuous flow under fully automatic control. Photographs, diagram.

2981* Effect of Slime on the Flotation of Coal Fines. (Russian.) I. N. Plaksin and N. S. Vlasova. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 6, June, p. 882-895.

Preliminary stirring of coal pulps impairs flotation because of fine particles produced. Graphs, tables. 2 ref.

2982* Units of Viscosity and Their Conversion. D. D. Fuller and P. L. Tea, Jr. *Lubrication Engineering*, v. 9, Dec. 1953, p. 307-308.

Includes table, chart.

2983 Continuous Wax Molding. Ray Shannon. *Mechanical Engineering*, v. 75, Dec. 1953, p. 963-966.

Describes wax molder and its operation and maintenance. Diagrams, graphs, tables.

2984* Yield of Alcohol During Yeast Fermentation. I. Calculation of the Actual Yield of Alcohol During Fermentation of Wood. (Russian.) E. K. Kardo-Sysoeva and V. A. Utenkova-Rantsan. *Mikrobiologiia*, v. 22, no. 5, Sept.-Oct. 1953, p. 551-558.

Actual yields under factory conditions of 82 to 89% of theoretical were obtained. Tables. 3 ref.

2985* Production of Power and Chemicals From One Fuel. (Russian.) N. M. Karavaev. *Nauka i Zhizn*, v. 20, no. 7, July 1953, p. 15-16.

Describes economics of semi-coking low grade fuels. Diagram, photographs.

2986 Transactions and Communications. Stand Oil Fractionation. F. T. Walker, T. Mackay, and K. B. Taylor. *Oil & Colour Chemists' Association, Journal*, v. 36, Dec. 1953, p. 667-688.

Fractionation techniques evolved to study basic mechanism of thermal polymerization of drying oils can be applied to technological evaluation of stand oils produced under different conditons. Tables, diagrams, graphs. 20 ref.

2987 Continuous Analysis Sampling in Petroleum and Petrochemical Processing. I. Objective: A Measureable and Representative Sample. S. B. Spracklen. **II. How An-**

Chemical Engineering

alyzer Fits Into the System. B. W. Thomas and R. L. Martin. **III. Petrochemical Systems Must Be Tailor Made.** Frank L. Barr. *Oil and Gas Journal*, v. 52, Dec. 7, 1953, p. 94-100.
Includes diagrams.

2988 Sun Joins Giants. George Weber. *Oil and Gas Journal*, v. 52, Dec. 14, 1953, p. 84-85.
New aromatics plant can produce 12% of national capacity of benzene, toluene, and mixed xylenes. Photographs.

2989* Industrial Applications of Ion Exchange. T. V. Arden. *Overseas Engineer*, v. 27, Dec. 1953, p. 174-176.
Describes purification and demineralization of natural waters and other solutions. Photographs, diagrams.

2990 First Orthoflow Cat Cracker in Oklahoma. Roy V. McGrath. *Petroleum Engineer*, v. 25, Dec. 1953, p. C5-C6.
Low first-cost feature of this unit; sieve-type trays used in absorber-stripper and in gasoline stabilizer. Photographs, diagram, table.

2991 Fractionation, Dehydration Innovation in Ambrose Gasoline Plant. M. F. Wirges. *Petroleum Engineer*, v. 25, Dec. 1953, p. C14, C16, C18, C21.
Includes diagrams, photographs.

2992 Mechanical Design for Fluid Catalytic Cracking Units. R. A. Harang. *Petroleum Engineer*, v. 25, Dec. 1953, p. C31-C32, C34, C36.
Application of fluid principle has solved heat removal problem, upped capacity efficiency greatly. Diagrams. 3 ref.

2993 Evaluation of Cracking Catalysts. C. K. Viland. *Petroleum Processing*, v. 8, Dec. 1953, p. 1874-1879.
Presents method of obtaining performance data with an automatic, fluidized, fixed-bed aging unit as a useful tool for studying aging of catalysts. Diagram, graphs, photograph.

2994 "Foam" Floating Roof Pays Off. *Petroleum Processing*, v. 8, Dec. 1953, p. 1884-1888.
Based on "Microballoons and Their Use in Reducing Evaporation Losses of Crude Oil", E. G. Ellerbrake and Frank Veatch. Presented at a meeting of API, Chicago, Nov. 1953. Tests under wide variety of operating conditions and in several tank sizes have shown evaporations loss reduction in crude oil storage of 80 to 90% is attainable. Tables, graphs.

2995* Multicolumn Continuous Distillation. (Polish.) R. Dobrowolski. *Przemysl Chemiczny*, v. 9, no. 8, Aug. 1953, p. 419-426.
Describes installation for fatty acid distillation. Tables, graphs, diagrams.

2996* Burning Different Sulfides Using Fluidization Technique. (Polish.) J. Ciborowski and B. Mlodzinski. *Przemysl Chemiczny*, v. 9, no. 9, Sept. 1953, p. 443-449.
Presents results of burning flotation blende, sedimentary blende, pyritic dolomite, pyritic serpentine, and pyrite containing mud. Describes influence of air velocity, temperature, and light of fluidized column. Graphs, tables.

2997* Calculations of the Yield of Gas Phase Reactions. (Polish.) W. Tomassi. *Przemysl Chemiczny*, v. 9, no. 9, Sept. 1953, p. 458-461.
Presents formula connecting yield of gas reaction with equilibrium constant.

2998* Analysis by Adsorption on Silica Gel Applied to the Study and Control of Raffinates by Solvent Treatment of Lubricating Oils. (French.) G. Costantinides, T. Policastro, and G. Arich. *Revue de l'institut francais du petrole et Annales des combustibles liquides*, v. 8, no. 9, Sept. 1953, p. 447-453.
Includes diagrams, graphs, tables. 3 ref.

2999* Physics of Coal. Problems of Breakage and Structure. R. L. Brown. *Times Science Review*, 1953, Winter, p. 13-14.
Includes size distribution, microstructures, and energy considerations in crushing. Diagrams, photographs.

See also:
3139 (design of plants for corrosion prevention)
3287 (water conservation in petroleum refining)
3347 (gasification of residuum)
3360 (manufacture of carbon electrodes)
4283 (acetylene generators)

CHEMISTRY—ANALYTICAL AND INORGANIC

3000* A Self-Recording Strip Photometer for Paper Electrophoresis and Paper Chromatography. (English.) Jorma K. Miettinen and Tauno Moisio. *Acta Chemica Scandinavica*, v. 7, no. 9, 1953, p. 1225-1238.
Includes graphs, diagrams, table, photograph. 27 ref.

3001 The Reaction of Low Molecular Weight Silicic Acids With Molybdic Acid. G. B. Alexander. *American Chemical Society, Journal*, v. 75, Nov. 20, 1953, p. 5655-5657.
Rate of reaction of molybdic acid with monosilicic, disilicic, and low molecular weight polysilicic acids is quantitatively reproducible and varies inversely with degree of polymerization of the silica. Graph, table. 10 ref.

3002 The Separation of Technetium From Molybdenum, Cobalt and Silver. Norris F. Hall and Don H. Johns. *American Chemical Society, Journal*, v. 75, Dec. 5, 1953, p. 5787-5791.
Includes graphs, tables. 12 ref.

3003 The System H_2O-$NaPO_3$. George W. Morey. *American Chemical Society, Journal*, v. 75, Dec. 5, 1953, p. 5794-5797.
Solubility relations in system H_2O-$NaPO_3$ up to melting point of $NaPO_3$ were determined. Graph, tables. 8 ref.

3004* Detection of Thallium With Rhodamine B by the Drop Test and Trace Analysis. (German.) F. Feigl, V. Gentil, and D. Goldstein. *Analytica Chimica Acta*, v. 9, no. 5, Nov. 1953, p. 393-399.
Solution shows an orange-red fluorescence in ultraviolet light. Describes mechanism of fluorescent reaction. 15 ref.

3005* The Complexometric Determination of Zinc in the Presence of Large Quantities of Magnesium. (English.) E. G. Brown and T. J. Hayes. *Analytica Chimica Acta*, v. 9, no. 5, Nov. 1953, p. 408-414.
Method of regenerating the column in 2 stages gave more consistent results than single regeneration using NaCl solution. Tables, graph. 9 ref.

3006* Colorimetric Analysis of Small Quantities of Cerium in Uranium. (French.) J. Huré and R. Saint James-Schonberg. *Analytica Chimica Acta*, v. 9, no. 5, Nov. 1953, p. 415-424.
After extraction of Fe and U thiocyanates by ethyl acetate, solution was oxidized by ammonium persulfate in presence of $AgNO_3$. Graphs, table. 5 ref.

3007* Iron, Chromium and Aluminium Phthalate Complexes and Their Application to the Determination of the Metals. A Heterometric Study. (English.) M. Bobtelsky and I. Bar-Gadda. *Analytica Chimica Acta*, v. 9, no. 5, Nov. 1953, p. 446-454.
A series of soluble and insoluble phthalates were obtained. Their behavior, composition, and analytical applications were studied. Graphs, table. 9 ref.

3008* Polarographic Determination of Aluminum in Titanium Alloys. (English.) James J. Mikula and Maurice Codell. *Analytica Chimica Acta*, v. 9, no. 5, Nov. 1953, p. 467-475.
Describes accurate and fairly rapid method based on reduction of an Al-azo dye complex after removing Ti by cupferron precipitation followed by electrolysis at Hg cathode. Tables, graphs. 20 ref.

3009 The Quantitative Separation of Copper, Lead and Tin by Cathodic Deposition. G. H. Aylward and A. Bryson. *Analyst*, v. 78, Nov. 1953, p. 651-655.
Includes tables. 11 ref.

3010* Analysis of Materials. K. H. Storks. *Bell Laboratories Record*, v. 31, Nov. 1953, p. 427-433.

Presents brief description of variety of analytical methods. Photographs.

3011* Qualitative Spectrochemical Analysis. W. Hartmann. *Bell Laboratories Record*, v. 31, Dec. 1953, p. 470-475.

Describes equipment, operational characteristics, and techniques employed. Photographs, table, diagrams.

3012* EDTA in Metallurgical Analysis, Especially for the Determination of Nickel and Zinc. H. Flaschka. *Chemist Analyst*, v. 42, Dec. 1953, p. 84-86.

Describes reagents and procedures for use of ethylenediamine tetraacetic acid. Tables. 9 ref.

3013 Ion Exchange and Its Applications in the Fine Chemical Industry. E. L. Streatfield. *Chemistry & Industry*, 1953, no. 46, Nov., p. 1214-1222.

Describes mechanism of ion exchange; production and characteristics of resins; and applications of ion exchange in industry and therapeutics. Graphs, diagrams, tables. 51 ref.

3014* Circular Paper Chromatography. VII. A Technique for the Separation and Estimation of "Overlapping Amino Acids". K. V. Giri and N. A. N. Rao. *Indian Institute of Science, Journal*, v. 35, Sec. A, Oct. 1953, p. 343-353 + 2 plates.

Includes diagram, tables, chromatogram. 13 ref.

3015 The Vacuum Fusion for Determining Minute Quantities of Gases in Metals. William J. McMahon and Laurence S. Foster. *Journal of Chemical Education*, v. 30, Dec. 1953, p. 609-613.

Discusses principles, apparatus, accuracy, special techniques, and applications. Diagram, table, photograph. 12 ref.

3016 Trace Element Determination by the Mass Spectrometer. Mark G. Inghram. *Journal of Physical Chemistry*, v. 57, Nov. 1953, p. 809-813; disc., p. 814.

A review. 16 ref.

3017 A Sensitive Photometer Using Modulated Light and Its Application in a Uranium Fluorimeter. C. D. Florida and C. N. Davey. *Journal of Scientific Instruments*, v. 30, Nov. 1953, p. 409-412.

Describes photometer with a sensitivity of about 10^{-10} lumens. Diagrams. 4 ref.

3018 Use of Perchloric Acid in Electrochemical Analysis. George Norwitz. *Metallurgia*, v. 48, no. 289, Nov. 1953, p. 257-258.

26 ref.

3019* Titration of Cleaning Baths. (French.) G. Rossi-Landi. *Métallurgie et la construction mecanique*, v. 85, no. 11, Nov. 1953, p. 897.

Describes titration as a method for determining acid content of baths during cleansing operations.

3020* Determining Magnesium in Cast Iron. (Hungarian.) István Sajó and Pál Répás *Öntöde*, v. 4, no. 11, Nov. 1953, p. 225.

Describes a rapid and accurate method based on electrolyzing Fe with Hg cathode and titrating Mg by means of "complexone".

3021* Rapid Method for the Identification and Determination of Mg in Cast Iron. (Hungarian.) István Sajó. *Öntöde*, v. 4, no. 11, Nov. 1953, p. 225.

Reports on rapid and simple method based on the fact that Mg can be hydrolyzed with distilled water and magnesium-hydroxide formed in this manner will show a pink coloring with phenolphthalein.

3022* Photometric Method for Microdetermination of Copper in Soils. (Russian.) L. N. Lapin and V. P. Makarova. *Pochvovedenie*, 1953, no. 8, Aug., p. 82-89.

Development of method was made possible by discovery of a new qualitative reaction on an ion of bivalent Cu. Photographs, tables, graphs. 16 ref.

3023* Products of Oxidation of Spent Sulfite Liquor. (Polish.) Zb. Jedlinski and J. Sawlewicz. *Przemysl Chemiczny*, v. 9, no. 11, Nov. 1953, p. 568-574.

Describes oxidation process. Investigations were made of products obtained. Graphs, tables. 37 ref.

3024* Photocolorimetric Determination of Silver With P-Dimethyl-Amino-Benzylidene Rhodanine. M. Struszynski, T. Nowicka, and Z. Marczenko. *Przemysl Chemiczny*, v. 9, no. 11, Nov. 1953, p. 574-578.

Investigations were made on influence of pH, composition of solution, time, temperature, and protective colloids. Tables, graphs. 10 ref.

3025* The Polarographic Method of Analysis. (French.) A. Poussin. *Revue de l'institut francais du petrole et Annales des combustibles liquides*, v. 8, no. 10, Oct. 1953, p. 504-512.

Principles and equipment are described. Application was made to gasoline and lubricants. Diagrams, graphs. 26 ref.

3026* The Use of a Micro-Analyzer for the Determination of Oxygen in Pure Iron. (French.) L. Moreau, J. Talbot, and J. Bourrat. *Revue de métallurgie*, v. 50, no. 11, Nov. 1953, p. 775-779; disc., p. 779-780.

In one g. samples of Fe, 0.0005 to 0.25% O can be determined with micro-apparatus. Diagrams, photograph, table, graphs.

3027 Visual-Arc Spectroscopic Analysis. Maurice J. Peterson and Howard W. Jaffe. *U. S. Bureau of Mines Bulletin* 524, 1953, 20 p. + 1 plate. (TN21 Un3b)

Describes methods used to detect cationic constituents of minerals and boiler-scale materials by means of line or atomic spectra. Gives results of investigations to determine detection of additional anions. Lists equipment that is available commercially. Tables, diagrams, photograph. 21 ref.

3027a* Indirect Polarographic Determination of Aluminum in the Presence of Iron^{+3} and Calcium. (German.) Dagfin Lydersen. *Zeitschrift für analytische Chemie*, v. 139, no. 6, 1953, p. 401-408.

Investigates determination by means of ethylene diamine tetraacetate. Disturbances in analysis caused by presence of Ca are discussed. Graphs, table. 8 ref.

3028* An Alkalimetric Method of Determining Copper, Mercury, and Nickel. (German.) Georg Denk. *Zeitschrift für analytische Chemie*, v. 140, no. 2, 1953, p. 103-109.

Describes a simple, rapid, and sufficiently accurate method based on the fact that salts of Cu, Hg, and Ni can be titrated with an alkali at boiling temperatures. Tables. 3 ref.

3029* Critical Investigation on Applicability of Activated Carbon in Analytical Separation of Elementary Iodine From Ionized Iodine. (German.) H. Spitzy, H. Skrube, and F. S. Sadek. *Zeitschrift für analytische Chemie*, v. 140, no. 2, 1953, p. 110-121.

Investigation was made of adsorptive properties of different activated carbons for I. Tables. 13 ref.

Books and Miscellaneous Publications

3030 Organic Analysis. v. 1. 473 p. 1953. Interscience Publishers, Inc., New York, N. Y. (QD271 Or3)

Information on new methods and procedures reflecting modern trend in organic analysis by emphasizing functional group analysis and instrumental techniques.

See also:

2813 (determination of isocyanates in seeds)

CHEMISTRY—ORGANIC

3031* The Composition of Coffee Oil and Its Component Fatty Acids. N. A. Khan and J. B. Brown. *American Oil Chemists' Society, Journal*, v. 30, Dec. 1953, p. 606-609.

Specimen of coffee oil was examined with the objective of determining its composition in the light of possible uses of the oil which is recoverable as a by-product in the soluble coffee industry. Tables, chart. 18 ref.

3032* Highly Unsaturated Fatty Acids. I. A Survey of Possible Animal Sources. Ralph T. Holman and Sheldon I.

Chemistry—Organic

Greenberg. *American Oil Chemists' Society, Journal*, v. 30, Dec. 1953, p. 600-601.

Includes tables. 14 ref.

3033* The Importance of π-σ Interaction in Ethylene. Carl M. Moser. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1239-1245.

Includes tables. 19 ref.

3034* The Photochemical Oxidation of Acetone. D. E. Hoare. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1292-1297.

Experiments are described on photolysis by light of 3130 A at 120 and 200 C of acetone, formaldehyde, and oxygen in the three two-component mixtures. Tables. 11 ref.

3035* The Structure of Carbon Monoxide. R. C. Sahni. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1246-1253.

Electronic structure of CO is discussed in terms of molecular orbitals. Properties of localized orbitals are discussed for an unsymmetrical molecule. Diagrams, tables. 9 ref.

3036* Effect of Small Additions of NO_2 on Oxidation of Propane. (Russian.) A. F. Revzin and V. Ia. Shtern. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 123-126.

Describes influence of temperature on rate of oxidation. Tables, graphs. 12 ref.

3037* Characteristics of Initiating Reaction by Tertiary Hydrogen Peroxide During Emulsion Polymerization. (Russian.) T. I. Iurzhenko, V. A. Puchin, and K. S. Grigor'eva. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 97-100.

Explains specific role of an aqueous-emulsion medium in initiation of polymerization of unsaturated compounds. Tables, graphs. 5 ref.

3038 Gum Arabic. II. J. Morris. *Adhesives & Resins*, v. 1, Nov. 1953, p. 243-249.

Outlines properties and uses. Photographs, tables.

3039 The Rearrangement of Hydrazones and Semicarbazones. D. E. Pearson, K. N. Carter, and C. M. Greer. *American Chemical Society, Journal*, v. 75, Dec. 5, 1953, p. 5905-5908.

Hydrazones were rearranged to amides by means of $NaNO_2$ and concentrated H_2SO_4. 25 ref.

3040 Intermediates in the Reactions of Carboxylic Acid Derivatives. II. Infrared Absorption Spectra as Evidence for the Formation of Addition Compounds of Carboxylic Acid Derivatives. Myron L. Bender. *American Chemical Society, Journal*, v. 75, Dec. 5, 1953, p. 5986-5990.

Includes graph, tables. 23 ref.

3041 Some Properties of Selenium Tetrafluoride. R. D. Peacock. *Chemical Society, Journal*, 1953, Nov., p. 3617-3619.

Vapor pressure, surface tension, and reactions are described. Table.

3042 The Catalytic Deuteration of Organic Compounds. III. Exchange Reactions of Saturated Aliphatic Carboxylic Acids. J. Bell, T. Hill, K. A. MacDonald, R. I. Reed, and A. MacDonald. **IV. The Deuteration of Optically Active Lactic Acid.** J. Bell, K. A. MacDonald, and R. I. Reed. *Chemical Society, Journal*, 1953, Nov., p. 3456-3463.

Includes tables.

3043 Some Photochemical Reactions Between Quinones and Hydrocarbons. R. F. Moore and William A. Waters. *Chemical Society, Journal*, 1953, Nov., p. 3405-3408.

Photochemical dehydrogenations of *p*-xylene, cumene, and tetralin by means of phenanthraquinone, chloranil, and 1:4-naphthaquinone were examined. A study of reaction products show that hydrogen abstraction is homolytic.

3044 Fatty Acids of Filbert Oil and Nasturtium Seed Oil. Mary J. Chisholm and C. Y. Hopkins. *Canadian Journal of Chemistry*, v. 31, Nov. 1953, p. 1131-1137.

Fatty acid compositions were estimated by means of ester distillation and low-temperature crystallization. Tables. 10 ref.

3045* Investigation of the Chain Reaction of Acetaldehyde With the Help of Radioactive Carbon. (Russian.) M. B. Neiman and G. I. Feklisov. *Doklady Akademii Nauk SSSR*, v. 90, no. 4, June 1, 1953, p. 583-586.

Discusses separation of the crystalline derivative of methyl alcohol from the products of cold-flame oxidation of acetaldehyde. Graphs, table, diagram. 11 ref.

3046* Study of the Oxidation of Propylene With the Help of Radiocarbon. (Russian.) A. F. Lukovnikov and M. B. Neiman. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 581-584.

Concludes that 25% of formaldehyde must be formed from the middle carbon atom of a propylene molecule. Graph, table. 8 ref.

3047* Calculation and Interpretation of Vibration Spectra of Formic Acid and Its Deuterosubstitutes. (Russian.) L. M. Sverdlov. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 503-505.

System of calculated dynamic coefficients correspond quite well to true potential field of formic acid molecules. Graph, table. 8 ref.

3048* Calculation and Interpretation of Vibration Spectra of Benzene and Deuterobenzene. (Russian.) M. H. Kovner. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 499-502.

Complete system of coefficients of effect of benzene was calculated. Tables. 9 ref.

3049* The Stability of Ethylene Oxide. E. Milton Wilson. *American Rocket Society, Journal*, v. 23, Nov.-Dec. 1953, p. 368-369.

Stability of ethylene oxide under adverse pressurization conditions was demonstrated by a series of tests in which compound was pressurized at rates as great as 200,000 psi/sec and was ejected through small, sharp-edge orifices at high pressure drops. Tables, diagram, photograph. 3 ref.

3050* Reaction of the Diphenyl-Picryl-Hydrazyl With Ethylinic Compounds. (French.) A. Chapiro, J. Durup, and J. Grosmangin. *Journal de chimie physique*, v. 50, no. 9, Sept. 1953, p. 482-490.

Studies were made of reactions with styroline to form free radicals in presence and absence of air. Diagrams, tables, graphs. 9 ref.

3051* Evaluation of Sea-Water Laundry Detergents. I. Rubin Bernstein and Harry Sosson. *Soap and Sanitary Chemicals*, v. 29, Dec. 1953, p. 42-45, 203, 205.

Includes photographs, tables. 9 ref. (To be continued.)

3052* Theoretical Study of Acetylenic Compounds. I. Electronic Structure of Acetylene. (French.) Josiane Serre and Alberte Pullman. *Journal de chimie physique*, v. 50, no. 9, Sept. 1953, p. 447-458.

Interaction of configurations produce no improvement of results of spectral transitions. Tables, graphs. 29 ref.

3053* Study of Effects of Radiation of the Dilute Solution of Diphenyl-Picryl-Hydrazyl in Organic Solvents. I. Radiation of Chloroform Elaborating a Method of Chemical Preparation of Ionizing Radiations. (French.) A. Chapiro, J. W. Boag, M. Ebert, and L. H. Gray. *Journel de chimie physique*, v. 50, no. 9, Sept. 1953, p 468-481.

Includes diagrams, graphs, tables. 20 ref.

3054* The Kinetics of Degradation of Chloramphenicol in Solution. I. A Study of the Rate of Formation of Chloride Ion in Aqueous Media. T. Higuchi and Charles D. Bias. *American Pharamceutical Association, Journal (Scientific Ed.)*, v. 42, Dec. 1953, p. 707-714.

Presents an example of how kinetic studies can be used to elucidate mechanism of breakdown of complex drugs. Graphs, tables, diagrams. 6 ref.

3055 The Chemistry of Hydrazyl Free Radicals. II. Synthesis and Dissociation of Tetra-(4-Fluorophenyl) Hydrazine. F. Benington, Eleanor V. Shoop, and R. H. Poirier. *Journal of Organic Chemistry*, v. 18, Nov. 1953, p. 1506-1510.
Includes diagrams. 13 ref.

3056 The Preparation of β-Keto Esters From Nitriles and α-Bromoesters. James Cason, Kenneth L. Rinehart, Jr., and Stephen D. Thornton, Jr. *Journal of Organic Chemistry*, v. 18, Nov. 1953, p. 1594-1600.
Includes tables. 24 ref.

3057 Friedel-Crafts Reaction Involving Unsaturated Ketones and Esters. II. Convenient Syntheses of Some Alkylnaphthalenes. S. M. Mukherji, O. P. Vig, S. Singh, and N. K. Bhattacharyya. *Journal of Organic Chemistry*, v. 18, Nov. 1953, p. 1499-1505.
Includes diagrams. 17 ref.

3058 The Structure of Terramycin. F. A. Hochstein, C. R. Stephens, L. H. Conover, P. P. Regna, R. Pasternack, P. N. Gordon, F. J. Pilgrim, K. J. Brunings, and R. B. Woodward. *American Chemical Society, Journal*, v. 75, Nov. 20, 1953, p. 5455-5475.
Includes graphs. 67 ref.

3059 Separation of Organic Liquid Mixtures by Thermal Diffusion. A. Letcher Jones and Ernest C. Milberger. *Industrial and Engineering Chemistry*, v. 45, Dec. 1953, p. 2689-2696.
Describes small scale laboratory fractionating column. Gives experimental procedures and performance data. Graphs, tables, diagrams. 29 ref.

3060 The Chlorination of Methyl Acrylate in the Presence of Methanol. N. D. Lee, D. Faulkner, H. C. Highet, A. R. Philpotts, and W. Thain. *Journal of Applied Chemistry*, v. 3, Nov. 1953, p. 481-486.
Describes chlorination procedure and resulting products. Graphs, tables. 10 ref.

See also:
3082 (review of tung oil)
3083 (partially hydrogenated tung oils)
3084 (polymerization of drying oils)

CHEMISTRY—PHYSICAL

3061 Ion Exchange as a Separation Method. VI. Column Studies of the Relative Efficiencies of Various Complexing Agents for the Separation of Lighter Rare Earths. S. W. Mayer and E. C. Freiling. *American Chemical Society, Journal*, v. 75, Nov. 20, 1953, p. 5647-5649.
Using columns of Dowex-50 cation-exchange resin at 87 C, Sm-Eu and Eu-Tb separation factors were determined for a number of complexing agents under dynamic conditions. Graphs, tables. 7 ref.

3062 Specific Effects in Acid Catalysis by Ion Exchange Resins. II. Hydrolysis of Esters in Water Solution. Sidney A. Bernhard and Louis P. Hammett. *American Chemical Society, Journal*, v. 75, Dec. 5, 1953, p. 5834-5835.
Includes tables. 6 ref.

3063* Sedimentation Coefficients of Small Molecules: Method of Measurement Based on the Refractive-Index Gradient Curve. The Sedimentation Coefficient of Polyglucose A. R. L. Baldwin. *Biochemical Journal*, v. 55, Nov. 1953, p. 644-648.
Includes photographs. 16 ref.

3064 The Electrical Conductivity of Molten Oxides. A. E. van Arkel, E. A. Flood, and Norman F. H. Bright. *Canadian Journal of Chemistry*, v. 31, Nov. 1953, p. 1009-1019.
Includes tables. 29 ref.

3065 The Surface Tension of Liquid Helium. K. R. Atkins. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1165-1169.
Includes graphs. 5 ref.

3066 Temperature Control in Glass Electrode pH Measurements. S. Lewin. *Chemistry & Industry*, 1953, no. 45, Nov. 7, p. 1193-1197.
Describes apparatus and techniques. Presents results of experimental studies. Diagrams. 16 ref.

3067 Detergency as Applied to Radiological Decontamination. Gonzalo Segura, Jr., Cornelia T. Snell, Shepherd Stigman, and Foster Dee Snell. *Chemistry & Industry*, 1953, no. 48, Nov. 28, p. 1270-1273.
Includes tables. 8 ref.

3068* Isomorphism of Compounds With Covalent Bonds. (Russian.) N. A. Goriunova and N. N. Fedorova. *Doklady Akademii Nauk SSSR*, v. 90, no. 6, June 21, 1953, p. 1039-1041.
Effects of closeness and type of bonds on isomorphic conditions are described. Table. 2 ref.

3069* Some Similarities and Differences of Processes Taking Place During Photolysis and Second Aging of Photographic Emulsion. (Russian.) B. G. Varshaver and A. A. Titov. *Doklady Akademii Nauk SSSR*, v. 91, no. 1, July 21, 1953, p. 111-114.
Explains observable non-stable quality of photolytic equivalent of aging. Graphs. 3 ref.

3070* Influence of Oxide Films on the Adsorption Effect of Facilitating Deformation of Metallic Monocrystals. (Russian.) V. N. Rozhanskii and P. A. Rebinder. *Doklady Akademii Nauk SSSR*, v. 91, no. 1, July 21, 1953, p. 129-131.
Includes graphs. 13 ref.

3071* Cr-Cr_2O_3 System. (Russian.) Ia. I. Ol'shanskii and V. K. Shlepov. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 561-564.
Attempts to determine equilibrium of a fusion with solid Cr_2O_3 were unsuccessful. Table, graph. 10 ref.

3072* Oxidation of Methane Under Conditions of Adiabatic Compression. (Russian.) M. S. Furman and D. S. Tsiklis. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 597-598.
Data show that even under atmospheric pressure and temperatures, disintegration of carbon dioxide cannot proceed. None of the tests gave evidence of elementary carbon formation. Graph, table. 8 ref.

3073* Investigation of the Oxidation of 1-C^{14}-Butane and the Theory of Destructive Oxidation. (Russian.) M. B. Neiman and G. I. Feklisov. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 877-880.
Data obtained in determination of CO and CO_2 show that activity of these compounds differ greatly and that CO_2 cannot be obtained through CO oxidation alone. Tables, graphs. 7 ref.

3074* Kinetics of Luminescence of Silver-Haloid Salts. (Russian.) V. A. Arkhangel'skaia and P. P. Feofilov. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1055-1058.
Various pure salts of AgCl, AgBr, and AgI in various forms were studied. Luminescence was observed in liquid air temperature. Graphs, micrographs. 10 ref.

3075* The Measure of Electro-Negativity. H. A. Skinner and H. O. Pritchard. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1254-1262.
Electro-affinity scale is re-examined and extended to include all elements of first and second rows of periodic table. Tables, graph. 20 ref.

3076* Kinetic Studies in Gas-Liquid Systems. I. A Diaphragm Method of Following Initial Absorption Rates. F. Goodridge. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1324-1332 + 1 plate.
Describes instrument used in experimental studies for measuring initial rate of absorption in a gas-liquid system by exposing a falling drop of absorbent to a static gaseous atmosphere. Diagrams, tables, graphs. 8 ref.

Chemistry—Physical

3077* Heats of Adsorption of Ammonia and Hydrogen on Metal Films. M. Wahba and C. Kemball. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1351-1360.

Experimental studies in calorimetric measurements are discussed. Graphs, tables. 11 ref.

3078 Physical Chemistry of Ionic Crystals Involving Small Concentrations of Foreign Substances. Carl Wagner. *Journal of Physical Chemistry*, v. 57, Nov. 1953, p. 738-741; disc., p. 741-742.

Role of lattice defects for solubility problems in ionic crystals is shown. 34 ref.

3079 The Determination of Infra-Red Absorption Spectra From Reflection Measurements. T. S. Robinson and W. C. Price. *Physical Society, Proceedings*, v. 66, no. 407 B, Nov. 1953, p. 969-974.

Theory of infra-red reflection spectra was applied to obtain frequencies and extinction coefficients of intense absorption bands in polytetrafluorethylene near 8·5 microns to determine number and states of polarization to fundamental NH stretching adsorption bands in a crystal of urea. Graphs. 14 ref.

3080* Simplified Method of Using Electrode of Second Kind. (Polish.) W. Tomassi, W. Jodzewicz, W. Sojecki, and M. Horoszewicz. *Przemysl Chemiczny*, v. 9, no. 11, Nov. 1953, p. 560-564.

For measuring electrode potential with accuracy not exceeding centrations not lower than 0.001 N. 7 ref.

3081* Nonstationary Diffusion in Stratified Media. (German.) Emil Deeg. *Zeitschrift für angewandte Physik*, v. 5, no. 10, Oct. 1953, p. 370-374.

Theoretical presentation of diffusion problems of water between two adjoining media (dross and plaster mold) having a different coefficient and different water absorption. Applicability of calculation method to problem of heat conduction as well as to multidimensional systems is indicated. Graphs.

See also:
3956 (crystal chemistry of β metals)

COATINGS

3082* Tung Oil Review, 1951-1952. Ralph W. Planck. *American Oil Chemists' Society, Journal*, v. 30, Dec. 1953, p. 587-591.

Comprised of books, articles, and patents dealing with chemistry and technology of tung oil and other tung products. 205 ref.

3083* Determination of the Fatty Acid Composition of Partially Hydrogenated Tung Oils. Ralph W. Planck, Frank C. Pack, Dorothy C. Heinzelman, Mack F. Stansbury, and Robert T. O'Connor. *American Oil Chemists' Society, Journal*, v. 30, Dec. 1953, p. 589-599.

Data are presented which show changes in fatty acid composition occuring during hydrogenation (170°, 5 p.s.i. g. H_2, 0.1 % Ni) of a domestic tung oil from an iodine value of 231 to 78. Graph, table. 12 ref.

3084 Polymerization of Drying Oils by Heat. I. William Brushwell. *American Paint Journal*, v. 38, Dec. 7, 1953, p. 74, 76, 78, 80, 82, 84, 86, 88, 90, 94.

Covers polymerization of simple molecules, linoleates, eleostearates, linolenates; polymerization rates; and practical applications of thermal polymerization. Diagrams. 22 ref.

3085 Polymerization of Drying Oils by Heat. II. William Brushwell. *American Paint Journal*, v. 38, Dec. 14, 1953, p. 68, 70, 73-74, 76, 78, 80, 82.

Covers polymerization of eleostearates monocyclic dimer formation; bicyclic dimer and cyclic monomer formation; polymerization of linolenates; polymerization rates; practical applications of thermal polymerization; conjugation of oils; and dimer acids. 20 ref.

3086 Fundamentals of Paint, Varnish and Lacquer Technology. Recent Developments in Raw Materials. Chapt. VIII. Oils. II. Elias Singer. *American Paint Journal*, v. 38, Dec. 14, 1953, p. 84-85, 88, 90, 92, 94, 96.

3087 Vinyltoluene—A New Spoke in the Vehicle Wheel. Walter A. Henson. *American Paint Journal*, v. 38, Dec. 21, 1953, p. 59, 62, 64, 66, 68, 70-72, 74.

Discusses production and properties of vinyltoluene paint vehicle. Graphs, diagrams.

3088 Three Steps to Progress in Porcelain Enameling. Robert A. Weaver, Jr. *Ceramic Industry*, v. 61, Nov. 1953, p. 61, 101.

Discusses three main production goals: flexibility, diversification, and development of new uses for porcelain enamel through technical and market research.

3089* Action of Ultrasounds During Anodic Oxidation. (French.) Jean-Jacques Trillat. *Comptes rendus*, v. 237, no. 19, Nov. 9, 1953, p. 1147-1148.

By causing an Al leaf to vibrate at ultrasonic frequencies and at the same time subjecting it to anodic oxidation, it was noted that structure and properties of the layer of alumina formed are very different from those obtained in absence of ultrasounds. Diagram.

3090* Influence of Oxide Coatings on Deformation of Aluminum in Inactive and Active Mediums. (Russian.) L. A. Kochanova and B. Ia. Iampol'skii. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 119-122.

Tests were made on polycrystalline pure Al wire. Table, graphs. 10 ref.

3091 The Anodizing of Zirconium and Other Transition Metals in Nitric Acid. R. D. Misch and W. E. Ruther. *Electrochemical Society, Journal*, v. 100, Dec. 1953, p. 531-537.

At 1 ma/cm^2 and concentrations of nitric acid exceeding 14 weight per cent. Zr was found to develop a low-resistance oxide layer. Ti, Hf, Cb, Ta, and W showed a high resistance at this current even in 70 weight per cent acid. Graphs, tables, diagram. 20 ref.

3092* Electric Hot-Galvanising Bath. *Engineering*, v. 176, Nov. 13, 1953, p. 638.

Describes equipment and its operation.

3093 Infra-Red Drying at Work on Porcelain Enamel. F. O. Mahery, Jr. *Finish*, v. 10, Dec. 1953, p. 30-31.

Discusses drying problems and their solution using infra-red heating. Photographs.

3094 Vitreous Enamelling in Sweden, Denmark and Finland. J. H. Gray. *Foundry Trade Journal*, v. 95, Dec. 3, 1953, p. 679-686.

Portrays enameling industry as it exists today. Photographs, tables. (To be concluded.)

3095* Factors Affecting the Selection of a Finish for Gas-Fired Space Heating Equipment. *Industrial Finishing (London)*, v. 6, Nov. 1953, p. 248-253.

Compares vitreous enamels with other types of finishes for radiant heaters. Photographs.

3096* Chemical Treatment of Ships' Hulls. *Industrial Finishing (London)*, v. 6, Nov. 1953, p. 260-262.

Describes tests of "Foscote R. S." coating designed for use on rusted steel. Photographs, table.

3097* Filling Leads to Fine Finishes. J. H. Ousbey. *Industrial Finishing (London)*, v. 6, Nov. 1953, p. 266, 268-280.

Describes fillers and their application to cast iron. Diagram.

3098 Finishing of New Republic Steel Kitchens. *Industrial Heating*, v. 20, Nov. 1953, p. 2255-2256, 2258-2260, 2262, 2264, 2268, 2270.

Production of a new improved line of steel kitchen cabinet and sink equipment has recently begun at Berger Mfg Div., Republic Steel Corp., Canton, Ohio. Photographs.

3099 Abrasion Resistant Coatings Sprayed on Metal Surfaces. W. G. Patton. *Iron Age*, v. 172, Dec. 3, 1953, p. 172-173.

Describes surface preparation and spraying operations in application of Ni-base alloy to pump plungers. Photographs.

3100 Intricate Procedures Solve Tough Hard-Facing Problems. J. Wischhusen. *Iron Age*, v. 172, Dec. 10, 1953, p. 164-167.

Describes rebuilding worn areas along flight edge of an extrusion screw and hard facing a cage wall in a steam valve. Photographs.

3101* Determination of the Reflection, Transmission, and Adsorption Factors of Thin Vapor-Deposited Gold Layers. (French.) P. Rouard, D. Malé, and J. Trompette. *Journal de physique et le radium*, v. 14, no. 11, Nov. 1953, p. 587-590.

Investigations were made on layers deposited on glass. Experimental details are described. Tables. 6 ref.

3102 Vitreous-Enamelled Aluminium Stock. C. R. Sigler. *Light Metals*, v. 16, Nov. 1953, p. 358-360.

Briefly describes pickling, spraying, firing, and inspection. Photographs. (To be concluded.)

3103 The Diffubrite Chromium Diffusion Process. *Machinery*, v. 83, Nov. 6, 1953, p. 891-897.

Describes method of treatment and applications of process. Photographs, tables, micrographs.

3104 Selecting Ceramic Coatings for Jet Engine Parts. W. C. Rous, Jr. *Materials & Methods*, v. 38, Dec. 1953, p. 116-119.

Discusses purposes and characteristics of ceramic coatings. Describes types, tests, and processes. Tables, photographs.

3105* Vacuum Metallizing and Plating—A Comparison. Isidore Cross. *Metal Finishing*, v. 51, Dec. 1953, p. 59-63, 78.

Compares vacuum evaporation with electroplating. Illustrates limitations, advantages, and applications of each. Photographs.

3106* Hot Tinning. (French.) G. Haas. *Métallurgie et la construction mecanique*, v. 85, no. 11, Nov. 1953, p. 895.

Presents a brief description of finishing operations and drying equipment.

3107 Vacuum Metallizing of Plastic Sheet. G. H. Bancroft. *Modern Plastics*, v. 31, Dec. 1953, p. 122-123, 210.

Describes equipment and operating procedures for coating acetate and styrene sheet with Al. Photograph.

3108 Esters of Titanium and Their Use in Paint. I. Preparation of Polymeric Butyl Titanates. II. Hydrolysis and Film Formation. III. Formulation and Performance of Butyl Titanate Paints. G. Winter. *Oil & Colour Chemists' Association, Journal*, v. 36, Dec. 1953, p. 689-708.

Polymeric butyl esters of Ti have been prepared by partial hydrolysis of the monomer using various amounts of water dissolved in butanol. Direct preparation of polymeric butyl titanate from Ti tetrachloride, butyl alcohol, and water on a pilot plant scale is described. Tables, graphs, diagrams. 10 ref.

3109 Some Applications of Statistical Methods to Exposure Trials. I. Analysis of Exposure Data. H. R. Touchin. *Oil & Colour Chemists' Association, Journal*, v. 36, Dec. 1953, p. 709-720.

Examples are given of statistical analysis of exposure data. Tables, graph. 23 ref.

3110 Adapting Spraying Methods to Various Finishes and Operations. H. Preuss. *Organic Finishing*, v. 14, Nov. 1953, p. 20-25, 29.

Describes how standard spray gun parts can be varied to accomplish specific purposes. Discusses special types of guns developed for unusual applications. Photographs.

3111 Phosphatizing Steel Surfaces. John E. Trumbour. *Organic Finishing*, v. 14, Nov. 1953, p. 26-29.

Discusses uses of phosphate coatings to improve paint bonding and prevent corrosion; and methods of applying and evaluating coatings. Photographs.

3112 Automotive Production Finishing. VII. The Changing Aspects of Automotive Finishes and Their Testing. Rick Mansell. *Organic Finishing*, v. 14, Nov. 1953, p. 30-33.

Discusses recent changes in composition, application techniques, and testing. Photographs.

3113* Meters for the Paint Industry. Howard Seibold. *Paint Industry Magazine*, v. 68, Nov. 1953, p. 10-12.

Describes what a meter is and various ways in which it can be effectively used in paint blending and manufacturing operations. Photographs.

3114 The Origin of Stress in Metal Layers Condensed From the Vapour in High Vacuum. H. P. Murbach and H. Wilman. *Physical Society, Proceedings*, v. 66, no. 407 B, Nov. 1953, p. 905-910.

Measurements are made of stress in deposits of Ni, Fe, Pb, Au, Cu, Ag, Sb, Al, Bi, Mg, and Zn on Cu strips. Stress is found to be characteristically of a tensile nature. Amount of stress is different for different metals. Diagrams, tables.

3115 Reflectivity of Thin Aluminium Films and Their Use in Interferometry. J. C. Burridge, H. Kuhn, and Anne Pery. *Physical Society, Proceedings*, v. 66, no. 407 B, Nov. 1953, p. 963-968.

Coefficients of transmission and reflection of thin Al films deposited on silica by vacuum evaporation were measured for wavelengths between 4200 and 2600 A. Graphs. 4 ref.

3116 Plan Protective Painting to Reduce Electrolytic Corrosion. L. G. Jones. *Power Engineering*, v. 57, Dec. 1953, p. 82-83.

Discusses electrolytic corrosion of metals and protection by anodic coatings on paints. Photograph, table. 5 ref.

3117* Electrostatic Spraying of Porcelain Enamel. M. L. Pouilly. *Product Finishing*, v. 18, Dec. 1953, p. 40, 42, 44, 46, 48.

Paper presented at 15th Annual Shop Practice Forum of Porcelain Enamel Institute, Columbus, Ohio.

3118* Anticorrosive Hard Rubber Coatings. (Polish.) Z. Macek. *Przemysl Chemiczny*, v. 9, no. 8, Aug. 1953, p. 426-428.

Describes coating of chemical equipment. Compares behavior of various compounds. Tables, photographs.

3119* Thickening of Flax Oil by Blowing in Air at Elevated Temperature. (Polish.) M. Taniewski. *Przemysl Chemiczny*, v. 9, no. 9, Sept. 1953, p. 461-463.

Resistance of varnish coatings to water is a function of size of the molecule rather than a function of viscosity. Table.

3120* Tell-Tale Paints Reveal Temperature Changes. J. E. Cowling. *Research Reviews, Office of Naval Research*, Nov. 1953, p. 1-5.

Describes research on a series of paints for temperature range 50 to 278 C. Photographs, tables.

3121 Furnace Tools Get New Lease on Life. T. F. Moeller. *Steel*, v. 133, Dec. 7, 1953, p. 139.

Describes refractory coatings for enamelling furnace tools.

3122 Instrumentation for Surface Finishing of Jet Engine Parts. R. J. Thomas. *Steel Processing*, v. 39, Nov. 1953, p. 591-593.

Describes automatic control equipment in finishing operations. Photographs.

3123 Protective Coatings for Etched Circuits. Morris Weinberg and L. J. Martin. *Tele-Tech*, v. 12, Dec. 1953, p. 88-89, 129, 134.

Insulation loss effect under high humidity conditions illustrates need for moisture-resistant coatings. Tests show resistance, recovery, and required thickness for various materials. Photographs, graph, table.

3124* Heat Resistance During Surface Alloying of Steel With Other Metals. (Russian.) G. N. Dubinin. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 74-79.

Results show that chromized iron and steel displayed best heat resistance. Tables, graphs. 23 ref.

See also:

3794 (microhardness of diffused Si coatings)
3960 (ceramic protective coatings)
4171 (rubber-base paints)
4211 (hydrophilic organic films)

CORROSION

3125* The Effects of Grain Refining Additions and Alloying With Magnesium Upon Corrosion Resistance of High-Purity Aluminum. (Hungarian.) Mária H. Gyenes. *Aluminium (Budapest)*, v. 5, no. 11, Nov. 1953, p. 225-235.

Results of investigations with various highly corrosive media are described and compared with data from literature. Tables, graphs, photographs. 24 ref.

3126* Protection Against Corrosion of Pipelines. (Hungarian.) Ferenc Zachemski. *Bányászati Lapok*, v. 8, no. 11, Nov. 1953, p. 559-565.

Describes corrosion and protection of a Hungarian pipeline built in 1940-42. Discusses examinations; onset of corrosion; course and repairs effected; causes of corrosion; galvanic reactions; and measures against them. Tables, diagrams, graphs. 7 ref.

3127 Durimet 20-Carpenter 20. Walter A. Luce. *Chemical Engineering*, v. 60, Dec. 1953, p. 276, 278, 288.

Charts corrosion rates in a number of chemicals. Gives mechanical properties and some applications. Photographs, tables, charts.

3128* Corrosion Test for Corrosion-Resistant Cr-Ni Austenitic Welded Steels (Proposal Drawn Up by the Commission 9 on Weldability of the International Welding Institute). (Spanish.) *Ciencia y técnica de la Soldadura*, v. 111, no. 14, Sept.-Oct. 1953, 2 p.

Outlines a test for determining susceptibility of welded stainless steels to intercrystalline corrosion. Diagrams.

3129 Cathodic Protection and High Resistivity Soil. H. C. Van Nouhuys. *Corrosion*, v. 9, Dec. 1953, p. 448-458; disc., p. 458-459.

Discusses pipeline system of 25 rectifiers in high resistivity soils. Describes comparative tests between Mg anodes and rectifiers. Photographs, maps, graphs, tables. 7 ref.

3130 Corrosion of Steel in Dilute Solutions of Sodium Salts of Weak Acids. M. J. Pryor. *Corrosion*, v. 9, Dec. 1953, p. 467-477.

Describes rate and form of corrosion of steel in dilute solutions of anodic inhibitors. Photograph, tables, graphs. 19 ref.

3131* Photographically Active Particles Evolved by Metals During Atmospheric Corrosion. (Russian.) I. L. Roikh and D. M. Rafalovich. *Doklady Akademii Nauk SSSR*, v. 90, no. 4, June 1, 1953, p. 603-606.

Metals liberate molecules of hydrogen peroxide in the course of atmospheric corrosion. Graphs. 7 ref.

3132* Passivation and Activation of Magnesium in an Alkaline Solution. (Russian.) E. V. Barelko and B. N. Kabanov. *Doklady Akademii Nauk SSSR*, v. 90, no. 6, June 21, 1953, p. 1059-1062.

Tests were made on 99.95% pure Mg with chemically pure KOH in distilled water. Graphs. 6 ref.

3133* Catalytic Corrosion. (Russian.) S. Z. Roginskii, I. I. Tret'iakov, and A. B. Shekhter. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 881-884 + 1 plate.

Discusses external effect of catalytic and sorption corrosion on surface structure. Table, micrographs. 7 ref.

3134 The Reaction of Silver Alloys With Sulfur in Mineral Oil. I. Kinetics. R. T. Foley, M. J. Bolton, and W. Morrill. *Electrochemical Society, Journal*, v. 100, Dec. 1953, p. 538-542.

Traces course of reaction of Ag alloys with sulfur to determine mechanism of tarnishing. Typical reaction course consisted of an initial rapid reaction similar to unalloyed Ag followed by a linear steady-state phase. Graphs, tables. 10 ref.

3135 Mechanism of Reaction of Aluminum and Aluminum Alloys With Carbon Tetrachloride. Milton Stern and Herbert H. Uhlig. *Electrochemical Society, Journal*, v. 100, Dec. 1953, p. 543-552.

Proposes a raction mechanism. Discusses effects of alloying elements on induction period and corrosion rate. Diagram, graphs, tables. 17 ref.

3136* There's Trouble Ahead if Utilities Fail to Coordinate Their Corrosion Control Measures. Hugh L. Hamilton. *Gas*, v. 29, Dec. 1953, p. 51-52.

3137 The Inhibition by Quinolines and Thioureas of the Acid Dissolution of Mild Steel. T. P. Hoar and R. D. Holliday. *Journal of Applied Chemistry*, v. 3, Nov. 1953, p. 502-513.

Dissolution of mild steel by warm sulphuric acid, with and without organic inhibiting additions, was studied by simultaneous measurements of corrosion rate and corrosion potential; and by determination of true anodic and cathodic polarization curves in the neighborhood of the natural corrosion potential. Graphs, diagrams. 25 ref.

3138* Corrosion by Differential Aeration. Research on Zinc. (Italian.) G. Bianchi. *Metallurgia italiana*, v. 45, no. 9, Sept. 1953, p. 323-327.

Process can be controlled by diffusion of oxygen in the solution or by anodic control. Diagrams, photographs, graphs, table. 4 ref.

3139 Fight Corrosion. Profit From Your Own Experience. *Petroleum Processing*, v. 8, Dec. 1953, p. 1866-1869.

Describes broadened program of corrosion prevention, including better correlation of corrosion data, extended inspection of metals, and avoidance of corrosion potentialities by design engineers. Charts.

3140* Coordination of Corrosion Control. Hugh L. Hamilton. *Pipe Line News*, v. 25, Dec. 1953, p. 44, 46, 48.

Outlines steps necessary for adequate coordination of corrosion.

3141 Progress Report on Development of a New Accelerated Corrosion Test. W. L. Pinner. *Plating*, v. 40, Dec. 1953, p. 1376-1378, 1383; disc., p. 1384.

Progress report of a committee project set up in 1951, by the AES. Table.

3142* Corrosion in Coke By-Products Industry. (Polish.) H. Wolk-Laniewska. *Przemysl Chemiczny*, v. 9, no. 9, Sept. 1953, p. 486-491.

Describes various methods which require coordination for improvement of corrosion control. Tables, photographs, micrographs.

3143* Corrosion in Refrigeration Systems Can Be Controlled. R. G. Rydell. *Refrigerating Engineering*, v. 61, Dec. 1953, p. 1330-1332, 1370-1372.

Discusses water factors that produce corrosion and chemicals that will reduce or prevent it. Graphs, tables.

3144 Magnetic Pumps for Corrosive Gases and Liquids. F. D. Rosen. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1061-1062.

Small, completely sealed, magnetically operated pumps have been constructed for use in circulation of corrosive gases. Diagrams, tables.

See also:

3116 (electrolytic corrosion)
3118 (anti corrosive hard rubber coatings)
3524 (corrosion in engine cooling systems)
3779 (corrosion of Cu bearing cast iron and steels)
3841 (corrosion resistance of foundry alloy A-Z5G)
3849 (corrosion resistance of steels)
3905 (corrosion by cutting oils)

ELECTRICAL ENGINEERING

3145* An Electroacoustic Method for Measuring Thermoelasticity. (Italian.) F. Gatto. *Alluminio*, v. 22, no. 5, Oct. 1953, p. 507-521.

Discusses application of method to measuring elastic constants, hardness, and recrystallization of Al. Tables, graphs, photographs, diagrams. 22 ref.

3146* The Synthesis of "Optimum" Transient Response: Criteria and Standard Forms. Dunstan Graham and R. C. Lathrop. *Application and Industry*, 1953, no. 9, p. 273-286; disc., p. 286-288.

Reviews methods for synthesizing servomechanisms. It is pointed

out that stability criteria, frequency, and root-locus methods reduce to conditions governing the transfer system. Graphs, diagrams, tables. 27 ref.

3147* The Spreading and Interface Resistances of Electric Contacts. Clarence W. Little, Jr. and William B. Kouwenhoven. *Applications and Industry*, 1953, no. 9, p. 314-323.

Includes graphs, diagrams, photographs, tables. 4 ref.

3148* Dielectric Behavior of Selenium Barrier Layers at High Temperature in the Blocking Range. (German.) Hans Heinrich Rust. *Archiv der elektrischen Ubertragung*, v. 7, no. 11, Nov. 1953, p. 549-553.

Describes experimental arrangement and procedure. Discusses analogy between dielectric behavior of barrier layers and that of ferroelectric materials. Tables, graphs, diagrams. 15 ref.

3149* A New General Purpose Polarized Relay. J. S. Garvin. *Bell Laboratories Record*, v. 31, Oct. 1953, p. 392-396.

Describes use and advantages of polarized relays. Discusses improved design resulting in reduced cost and increased sensitivity. Photographs, diagrams.

3150* New Wire Spring General Purpose Relay. H. M. Knapp. *Bell Laboratories Record*, v. 31, Nov. 1953, p. 417-425.

New design procedures and improved manufacturing methods have resulted in new relay which provides more reliable performance, reduced costs, and longer life. Graph, photographs, diagrams.

3151 Selenium Rectifiers—Factors in Their Application. J. Gramels. *Bell System Technical Journal*, v. 32, Nov. 1953, p. 1469-1492.

Discusses data required for selection of Se cell sizes and combinations. Shows typical voltage-current characteristics. Gives results of extensive life test data necessary for evaluating life expectancy. 9 ref.

3152 Arcing of Electrical Contacts in Telephone Switching Circuits. II. Characteristics of the Short Arc. M. M. Atalla. *Bell System Technical Journal*, v. 32, Nov. 1953, p. 1493-1506.

Measurements were made of arc initiation voltage, voltage drop across the arc, minimum arcing current. Graphs, tables.

3153* Economic Aspects of the Brown Boveri Consumer Load Control System. F. Bourquin. *Brown Boveri Review*, v. 40, no. 4, Apr. 1953, p. 103-111.

Shows how regulation of load to meet requirements of energy production and distribuiton installations can be most economically accomplished with aid of a central audio-frequency control system. Diagrams, photographs, tables.

3154* The Brown Boveri System of Consumer Load Control. H. Haug. *Brown Boveri Review*, v. 40, no. 4, Apr. 1953, p. 112-123.

Power consumption at various points in a distribution network is regulated from a central point by installation of a consumer-load control system. Control signals consist of audio-frequency pulses which are superimposed on the normal 50-c/s supply. Diagrams, photographs.

3155* The Brown Boveri Consumer Load Control Receiver. A. de Quervain. *Brown Boveri Review*, v. 40, no. 4, Apr. 1953, p. 124-130.

A consumer load control receiver selects and interprets audio-frequency signals superimposed on the line voltage. Diagrams, photographs, table.

3156* Planning of Consumer Load Control Installations. E. Steenbuch. *Brown Boveri Review*, v. 40, no. 4, Apr. 1953, p. 131-136.

Includes diagrams, tables.

3157* The Functioning of Surge-Voltage Generators. (French.) Jean Lagasse, Jacques Favarel, and Pierre Sido. *Comptes rendus*, v. 237, no. 19, Nov. 19, 1953, p. 1151-1152.

Presents various analytical and graphic methods for studying self-inductance generators.

3158* Electroconductivity of Cuprous Oxide. (Russian.) A. I. Andrievskii, V. I. Voloshchenko, and M. T. Mishchenko. *Doklady Akademii Nauk, SSSR*, v. 90, no. 4, June 1, 1953, p. 521-523.

Magnitude of specific electroconductivity of the cuprous oxide layer is proportional to number of grains on a surface unit of the specimen. Tables, graphs.

3159* Electroconductivity of Metals at a Large Current Density. (Russian.) E. S. Borovik. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 771-774.

Discusses deviations from Ohms law for Pt, W, and Cu under various current densities. Tables, graphs. 4 ref.

3160* Direct Electric Heating as a Means of Intensifying the Drawing Process. (Russian.) S. I. Gubkin and V. S. Muras. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 803-806.

Discusses operations and advantages of method. Micrograph, graphs. 3 ref.

3161* Scientific Problems of Mechanization and Electrification of the Rural Economy. (Russian.) V. A. Zheligovskii. *Doklady Vsesouznoi Ordena Lenina Akademii Selbskokhoziaistvennykh Nauk, Imeni V. I. Lenina*, v. 18, no. 9, Sept. 1953, p. 3-9.

Selection of machinery, equipment, and techniques is discussed.

3162* Progress in Farm Electrification Through Research. Walter H. Sammis. *Edison Electric Institute Bulletin*, v. 21, Dec. 1953, p. 443-447.

Describes research activities and utility area development program.

3163* Aging Tests Compare Transformer Oil Performance. L. B. Schofield and F. T. Carver. *Electrical World*, v. 140, Nov. 30, 1953, p. 81-83.

Presents results of experimental studies which indicate no financial advantages in reclaiming and inhibiting old transformer oil. Photographs, tables, graph.

3164* Single Channel Controls System Load and Frequency. G. S. Lunge. *Electrical World*, v. 140, Nov. 30, 1953, p. 86-88.

Describes control equipment for electric power transmission systems. Diagrams, photographs.

3165* Single-Phase Load Split on 3 Phases. B. W. Schafer. *Electrical World*, v. 140, Nov. 30, 1953, p. 92-93.

Single-phase indirect arc furnace is equipped with auxiliary equipment to spread load on three phases of incoming service. Diagrams, tables.

3166* Factors Determining the Potential Rise in Station Ground Mats. Martin J. Lantz. *Electrical World*, v. 140, Dec. 14, 1953, p. 127-129.

Includes photographs, graph, diagrams, table.

3167* Big Cliff Hydro Plant. Unattended and Remotely Controlled. William L. Sasser. *Electric Light and Power*, v. 31, Dec. 1953, p. 76-80.

Unique 20,000-kv.-amp., unattended, remotely controlled hydro project provides re-regulating reservoir for plant about three miles upstream. Automatic operations of dam spillway gates maintains steady downstream flow. Diagrams, photographs.

3168* Characteristics and Fusing of Floating-Neutral Wye-Connected Capacitor Banks. Peter M. Minder. *Electric Light and Power*, v. 31, Dec. 1953, p. 93-94.

Re-examines characteristics of floating and solidly-grounded wye-connected capacitor banks and sees how the new T-rated fuses can be applied. Table, diagram.

3169* Self Oscillation of Synchronous Machines Operating on Compensated Transmission Lines. (Russian.) Iu. A. Rozovskii. *Elektrichestvo*, 1953, no. 10, Oct., p. 3-8.

Discusses moment-velocity characteristics of prime mover, nonlinear vibrations of synchronous machines, and determination of conditions for existence of stable limit cycles. Graphs. 4 ref.

Electrical Engineering

3170* Saturated Current Transformers With Shorted Coils for Relay Protection. (Russian.) A. D. Drozdov. *Elektrichestvo*, 1953, no. 10, Oct., p. 32-36.

Describes transformers with shorted coils creating additional magnetization in the core. Diagrams, graphs.

3171* Contactless Frequency Relay. (Russian.) F. A. Katkov. *Elektrichestvo*, 1953, no. 10, Oct., p. 40-42.

Describes the relay. Shows its advantages compared with conventional relays. Diagrams, graphs.

3172* Rectifying Wattmeters for High Frequency Electrothermal Installations. (Russian.) A. V. Donskoi and G. V. Ivenskii. *Elektrichestvo*, 1953, no. 10, Oct., p. 46-50.

Describes operating principle. Discusses possibility of application to industry. Diagrams, graph. 7 ref.

3173* Common Properties of Magnetoelectric Indicators for Remote Measuring. (Russian.) L. M. Zaks. *Elektrichestvo*, 1953, no. 10, Oct., p. 51-55.

Discusses common relations between parameters of transmitters, indicators, and methods of calculation and investigation. Graphs, diagrams. 5 ref.

3174* Diagram for Phase Shift in Certain Frequency Ranges. (Russian.) A. R. Livshits and A. N. Zaslavskii. *Elektrichestvo*, 1953, no. 10, Oct., p. 56-58.

Describes diagram of phase shift of 90° at equal resistances. Diagrams, graphs.

3175* Analitical Calculation of Circuits With Nonlinear Capacitors. (Russian.) D. M. Kazarnovskii. *Elektrichestvo*, 1953, no. 10, Oct., p. 68-73.

Differential equations were set up and investigated by Galerkin's approximation method. Application of method is illustrated on several typical diagrams. Tables, graphs, diagrams. 3 ref.

3176* System of Units in Electrical Engineering. (Hungarian.) János Endrényi. *Elektrotechnika*, v. 46, no. 11, Nov. 1953, p. 307-314.

Discusses principals, limitations, terms of dimensions, and units. Tables. 16 ref.

3177* Analysis of Wind Pressure on Electrical Lines. (Hungarian.) István Csuhay. *Elektrotechnika*, v. 46, no. 11, Nov. 1953, p. 314-322.

Discusses determination of equality factor for dimensioning of overhead lines. Graphs. 14 ref.

3178* Application of Series Capacitors in High Voltage Electrical Systems. (Hungarian.) Gábor Fürst. *Elektrotechnika*, v. 46, no. 11, Nov. 1953, p. 322-330.

Discusses advantages of series capacitors in overhead lines with different voltages. Table, graphs. 2 ref.

3179* Winding Forces Existing Transversely to the Scattering Channel. (German.) Eberhard Fischer. *Elektrotechnische Zeitschrift*, v. 74, Ausgabe A, no. 21, Nov. 1, 1953, p. 614-617.

Proposes practical method for calculating transversal forces in tube-shaped windings. Discusses application of method to pile-wound coils. Diagrams, graphs. 3 ref.

3180* Effect of Electron Emission From Glowing Metals Upon the Disruptive Voltage With Respect to the Switching-Off Process in the Line Switch. (German.) H. Papen. *Elektrotechnische Zeitschrift*, v. 74, Ausgabe A, no. 21, Nov. 1, 1953, p. 618-620.

Characterizes physical processes during operation of high-voltage switches. Describes experiments and results. Diagrams, graphs. 3 ref.

3181* Electrical Drive of 14-in. Reversing Cold Strip Mill. *Engineer*, v. 196, Dec. 4, 1953, p. 728-730.

Describes electrical equipment for laboratory rolling mill used for study of variables such as speed, tension, and gauge control. Photographs, circuit diagram.

3182* How To Feed Electricity to Food Plant Equipment. K. P. Grenfell. *Food Engineering*, v. 25, Dec. 1953, p. 90-94.

Describes how to avoid production delays from power failures; eliminate kilowatt waste; and set up fully reliable, economical, electrical distribution system. Photographs, diagrams.

3183* Atmospheric Contamination on High Voltage Insulators and a Study to Improve Conditions. G. K. M. Pfestorf and M. R. Sitaram. *Indian Institute of Science, Journal*, v. 35, Sec. B, Oct. 1953, p. 170-178 + 3 plates.

Leakage current and flashover determinations were made on contaminated insulators and compared with similar measurements on new insulators. Some suggestions for reducing amount of contaminating deposits are made. Tables. 11 ref.

3184 The First Stage of the Electrification of the Estrada De Ferro Santos a Jundiai. (Late Sao Paulo Railway.) R. J. B. Chatterton and D. H. Rooney. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 1, no. 126, Nov. 1953, p. 319-331; disc., p. 332-338.

Presents a short history of railway development in Brazil. Describes electrification at 3,000 volts d.c. of 118 single-track miles of main lines and sidings. Graphs, diagrams.

3185 The Rating and Service Capacity of Traction Motors. I. Thermal Capacity of Traction Motors. II. A Temperature/Time and Ventilation Analysis. B. J. Prigmore. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 4, no. 5, Oct. 1953, p. 91-103.

Includes graphs. 21 ref.

3186* Stability of a Synchronous Generator With Ionic Exciter. (Russian.) V. I. Gorushkin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 5, May, p. 653-663.

Discusses static stability problems. Describes regulations by starter current, voltage, and displacement angle of rotor. Suggests three methods of quickly increasing voltage. Graphs, tables. 4 ref.

3187* Theory of Corona Discharge in Gas Under Constant Pressure. General Characteristics of the Unipolar Corona and the Volt-Ampere Dependence Equations for Ground-Wire Electrodes. (Russian.) V. I. Popkov. *Izvestiia Akademii Nauk SSSR, Otdelenie Teknicheskikh Nauk*, 1953, no. 5, May, p. 664-674.

Includes graphs. 3 ref.

3188* Emergency Reserve of Power and Energy in an Electric-Power System. (Russian.) M. A. Mostkov. *Izvestiia Akademii Nauk SSSR, Otdelenie Teknicheskikh Nauk*, 1953, no. 6, June, p. 828-836.

Presents a method of selecting the number of reserve units having approximately the same electrical output based on the probability of a defect in each unit being identical. Tables. 2 ref.

3189* Production of Optimum Current by Parametric Means During Starting of a Motor-Generator System. (Russian.) N. P. Kunitskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 8, Aug., p. 1143-1156.

Presents a theoretical and experimental investigation. Comprehensive starting diagrams confirm theoretical assumptions. Diagrams.

3190* Limit of Static Stability of a Synchronous Generator and a Method of Stabilizing the Excitation Control System. (Russian.) G. V. Mikhevich. *Izvestiia Akademii Nauk SSSR, Otdelenie Teknicheskikh Nauk*, 1953, no. 10, Oct., p. 1456-1464.

Line reactance, excitation voltage, rotor current, and angle of rotor displacement are used to increase stability. Graphs. 6 ref.

3191 What the New NEMA Standards Mean. E. F. Greiwe. *Product Engineering*, v. 24, Dec. 1953, p. 144-149.

Suggested standards for future design for NEMA design A and B, 1,800 r.p.m., 60 cycle, polyphase, open-type squirrel cage induction motors from 1 to 30 hp. inclusive. Tables, diagrams.

3192* Fan Motors Need Improvement for Room Air Conditioner Service. R. W. Morgan. *Refrigerating Engineering*, v. 61, Dec. 1953, p. 1315-1319, 1345, 1384, 1386.

If fan motors used in window units are to match long, trouble-

free operating life of the hermetic compressor, they must have vastly improved lubrication systems; better electrical characteristics; and be designed for easy maintenance removal from the air conditioner chassis. Photographs, diagrams, graphs.

3193 Pulse-Height Analyzer. J. W. Thomas, V. V. Verbinski, and W. E. Stephens. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1017-1020.

Describes instrument which can record 50 pulses per sec. Diagrams, graphs.

3194* Barium-Titanate-Containing Dielectrics. Their Structure and Special Dielectric Behavior. (German.) W. Soyck. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 10, Oct. 1953, p. 316-322.

High dielectric constant and high negative temperature coefficient of rutile structure of TiO_2 has led to investigation of various titanates. Dielectric constants of the titanates of Ba, Ca-Ba, and Ba-Mg at different temperatures are discussed. Graphs, diagrams. 15 ref.

3195* German Switchgear Construction in Iron and Steel Works. (German.) Botho Fleck. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1480-1484.

Discusses cut-off capacities of low voltage automatic circuit breakers and fuses. Describes differences in arrangement and operation between open and closed plants. Photographs, diagram, graphs.

3196 Encapsulated Test Prods. Rudolph L. Kuehn. *Tele-Tech*, v. 12, Dec. 1953, p. 84-85, 129, 134.

Resin embedment, as aid to unitized construction and subminiaturization, improves circuit reliability. Describes casting methods and proper selection of materials. Diagrams, tables, photograph.

3197 Aluminium Winding in Electrical Equipment. A. A. Defoe. *Times Review of Industry*, v. 7, new ser., Dec. 1953, p. 28-30.

Discusses applications in motors, generators, and transformers. Photographs, tables. 18 ref.

3198* Modern Testing Instruments for the Textile Industry. (German.) E. Wagner. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 31, Nov. 1, 1953, p. 1066-1070.

Describes various electrical equipment for testing moisture, tensile strength, and wear resistance of textile fibres. Diagrams.

3199* Use of the PS-500 Type Transformer for the Simultaneous Operation of Several Machines. (Russian.) P. F. Bilibin. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 87-88.

Discusses results attained. Diagram.

3200* Stabilizing the Electric Arc From the Anode and the Cathode. (German.) *Zeitschrift für Physik*, v. 136, no. 1, 1953, p. 1-16.

Presents considerations on anode based on assumption that saturation current intensity of plasma is decisive for adjustment of electric arc. Graphs. 19 ref.

Books and Miscellaneous Publications

3201 Principles of Transistor Circuits. Richard F. Shea, editor. 535 p. 1953. John Wiley & Sons. (QC544.T3 Sh31p)

Integrated treatment of transistor characteristics and transistor circuits, providing basic theory plus elaboration of techniques applicable in the field.

3202 Electric Fuses. H. Läpple. 173 p. 1952. Butterworths Scientific Publications, London. (TK3511 L12e)

Resumé of published information on fuses, with accent on practical and commercial engineering aspects.

See also:

2802 (applications of electricity at airports)
3624 (aluminum conductors in telephone cables)
3799 (electrical resistance of tempered metals)
3805 (properties of permalloy for medium and high frequencies)
3990 (effect of atomic energy on electric power industry)
3991 (design of electric field for a Van de Graaf generator)
4088 (atomic batteries)
4179 (higher secondary network voltages)
4185 (air filters for electrical installations)
4223 (electric heating elements)

ELECTROCHEMISTRY AND ELECTROPROCESSES

3203* The Anodic Treatment of Strips and Wires. (German.) E. Herrmann. *Aluminium*, v. 29, no. 11, Nov. 1953, p. 465-472.

Discusses stagnant anodic treatment, induction of electric power, prevention of overheating, and cooling. Diagrams. 34 ref.

3204 The Anodic Oxidation of Metals at Very Low Current Density. II. Nickel. III. Copper. S. E. S. El Wakkad and Sayeda H. Emara. *Chemical Society, Journal*, 1953, Nov., p. 3504-3512.

Studies were made in solutions of different pH values. Potential measurements were made. Graphs, tables.

3205* Electrolytic Polishing of Germanium and Platinum in the Presence of F^- or Cl^- Ions. (French.) Philippe Brouillet and Israël Epelborni. *Comptes rendus*, v. 237, no. 16, Oct. 19, 1953, p. 895-897.

Reports on experiments using a mixture of NaCl-KCl, melting at 661 C and the eutectic FNa-FK (699C), and a Pt electrode. Results are discussed. 5 ref.

3206* Particular Characteristics of an Anodic Spark in Spark Electrolysis. (French.) Pierre Barret. *Comptes rendus*, v. 237, no. 18, Nov. 2, 1953, p. 1084-1086.

Spark was sustained between an aerial electrode and surface of an electrolytic solution. Photographs.

3207* Diffusion of Metallic Ions Through Electrodeposited Metals. (French.) Helmi Makram. *Comptes rendus*, v. 237, no. 18, Nov. 12, 1953, p. 1086-1088.

Studies variation of passage of Cu ions through Cr plating as a function of Cr bath composition. Graphs.

3208* Experimental Study of the Poisoning of a Platinum-Electrode. (French.) Maurice Bonnemay. *Comptes rendus*, v. 237, no. 20, Nov. 16, 1953, p. 1235-1237.

Presents a study of hydrogen overvoltage curve relative to Pt-Pt electrodes poisoned by micro deposits of Pb or Zn. Graphs.

3209* Mechanism of the Process of Electropolishing Copper in Phosphoric Acid. (Russian.) A. V. Fortunatov and A. V. Finkel'shtein. *Doklady Akademii Nauk SSSR*, v. 90, no. 5, June 11, 1953, p. 823-826.

Representation of mechanism and kinetic equations were developed which conform well with experimentation. Graphs, tables. 5 ref.

3210 The Interaction of Organic Compounds With the Surface During the Electrodeposition of Nickel. Clayton C. Roth and Henry Leidheiser, Jr. *Electrochemical Society, Journal*, v. 100, Dec. 1953, p. 553-565.

Measurements of cathode potential were made during electrodeposition of Ni in presence of 76 organic compounds. Ability of the compound to make the cathode potential more negative at a fixed current density was dependent upon acidic or basic character of the compound, size of the molecule, and number of available pairs of electrons. Graphs, tables. 4 ref.

3211 Rate of Displacement of Silver From Aqueous Silver Nitrate by Zinc and Copper. Richard Glicksman, H. Mouquin, and Cecil V. King. *Electrochemical Society, Journal*, v. 100, Dec. 1953, p. 580-585.

Displacement rates were measured by rotating cylinders of Zn and Cu in $AgNO_3$ solutions for short time intervals, followed by analysis of solutions for Ag ion content. Graphs. 12 ref.

3212* Rod-Shaped Construction of the Standard Weston Cell. (German.) H. Eicke and A. Kessner. *Elektrotechnische Zeitschrift*, v. 74, Ausgabe A, no. 21, Nov. 1, 1953, p. 623-626.

Describes a new type of construction for the above in order to make possible a greater exactness in compensation measuring

Electrochemistry and Electroprocesses

processes. Discusses details of construction. Tables, graphs, photograph, diagram.

3213* Electrodeposition of Copper From the Diethanolamine Bath. N. B. Shivaraman and T. L. Rama Char. *Indian Institute of Science, Journal*, v. 35, Sec. A, Oct. 1953, p. 293-297.

Describes bath composition and procedure for plating steel. Tables. 7 ref.

3214* Electrodeposition of Silver From the Iodide Bath. T. L. Rama Char and R. Sadagopachari. *Indian Institute of Science, Journal*, v. 35, Sec. A, Oct. 1953, p. 298-306.

Silver was electrodeposited on Cu from a complex iodide solution. Tables. 11 ref.

3215* Studies in the Electrodeposition of Cobalt From Fluoborate Bath. D. M. Fegredo and J. Balachandra. *Indian Institute of Science, Journal*, v. 35, Sec. B, Oct. 1953, p. 191-201.

Optimum conditions for electrodeposition of Co were determined from a study of effect of different variables on plating characteristics of Co fluoborate solution. Tables, graphs. 8 ref.

3216 Electrolytic-Tinplate Instrumentation. William P. Smith. *Instruments*, v. 26, Dec. 1953, p. 1875, 1905-1906.

Each step on the electrolytic-tinplate production process uses instrumentation. Work remains to be done at several key points in the process.

3217 Chemical and Anodic Treatments. *Light Metals*, v. 16, Nov. 1953, p. 377.

Analysis of German patents on anodizing. Photograph.

3218* Electroplating in Israel. Marvin Rubinstein. *Metal Finishing*, v. 51, Dec. 1953, p. 69-73, 78.

Presents general discussion of the industry. Includes characteristics of finishing, cleaning procedures, plating solutions, quality control, polishing materials, and equipment utilized. Photographs.

3219 A Metallographic Study of Some Steels Used for Nickel Plating. A. E. R. Westman and F. A. Mohrnheim. *Plating*, v. 40, Dec. 1953, p. 1366-1372; disc., p. 1373-1375.

Study was undertaken to find what range of steels was being used in electroplating; perfect current techniques for studying zone of contact between basis metal and electroplate; and determine some plating failures in which basis metal might be at fault. Diagrams, photographs. 9 ref.

3220 The Analysis of Electroplating Solutions for Major Constituents. Earl J. Serfass. *Plating*, v. 40, Dec. 1953, p. 1385-1389; disc., p. 1389-1390.

Analyzes available methods for determination of macro constituents in Cr, Ag, Ni, and brass plating baths. Tables, diagrams.

3221 Effect of Impurities and Purification of Electroplating Solutions. I. Nickel Solutions. D. T. Ewing. *Plating*, v. 40, Dec. 1953, p. 1391-1400; disc., p. 1400.

Effects of hexavalent and trivalent Cu on appearance, adhesion, ductility, salt-spray (fog) corrosion resistance, hardness, and throwing power of Ni deposits were studied. Graphs, tables. 12 ref.

3222* The Analyst's Function in the Electroplating Industry. K. E. Langford. *Product Finishing*, v. 6, Nov. 1953, p. 48-55.

Article attempts to cover new ground by discussing function of the analytical chemist as an individual within the framework of the electroplating industry. Photographs.

3223* Review of Electroplating Plant. I. *Product Finishing*, v. 6, Nov. 1953, p. 79-88.

Reviews representative selection of generators, rectifiers, plating vats, and plating barrels. Photographs.

3224* Hard Chrome Plating Made Easy. Ezra A. Blount. *Product Finishing*, v. 18, Dec. 1953, p. 24-34, 36.

Describes Cr plating of dies for plastic molding industry, gages, tools, and parts for special applications. Photographs, table. 4 ref.

3225 Plated Coatings. Designers Weigh Tin Alloys. Frederick A. Lowenheim. *Steel*, v. 133, Nov. 30, 1953, p. 110-112.

Present ample Sn supply leads to closer examination of its potential as an alloying constituent. Success is seen with Pb, Zn, Ni, Cu, and Cd. Photographs, tables. 8 ref.

3226 Bronze Plating Solves Design and Corrosion Problems. W. H. Safranek, W. J. Neill, and D. E. Seelbach. *Steel*, v. 133, Dec. 21, 1953, p. 102-104, 106, 109.

Describes bronze plating process, its advantages, and applications. Photographs, micrographs. 6 ref.

3227* The Electrolytic Separation of Tin From Its Chlorine Compounds. II. Separation From Tin $^{+4}$ Salt Solutions. (German.) Arnaldo Foschini. *Zeitschrift für analytische Chemie*, v. 139, no. 6, 1953, p. 408-412.

Reports on investigations made on uncoated and Cu coated Winkler electrodes in presence and absence of ammonium oxalate. Tables. 3 ref.

See also:
3105 (comparison of electro plating with metallizing)
3708 (electrolytical glazing of Al)
4060 (control of electro chemical processes)

ELECTRONICS

3228 Etched Sandwiches for Microwave Circuits. *Aviation Age*, v. 29, Dec. 1953, p. 46-49.

Describes use of "microstrip", a wiring technique which uses printed circuits to simplify and reduce costs and weight of the conventional microwave systems.

3229 New Shield Gets Rid of Tube Heat Fast. Philip Klass. *Aviation Week*, v. 59, Dec. 14, 1953, p. 62, 64, 66.

Describes device which may lengthen sub-miniature tube life and improve reliability. Photographs, tables.

3230* The 4A Crossbar Toll System for Nationwide Dialing. O. Myers. *Bell Laboratories Record*, v. 31, Oct. 1953, p. 369-374.

Includes photographs, diagrams.

3231* The New Splendor of Switching. J. Meszar. *Bell Laboratories Record*, v. 31, Nov. 1953, p. 434-438.

Presents description of development of telephone switching. Discusses possible analogy to human brain. Photographs.

3232* The New Telephone Answering Set. C. R. Keith. *Bell Laboratories Record*, v. 31, Nov. 1953, p. 439-443.

Brief description of compact, economical unit adaptable for home use. Photographs, diagrams.

3233* Thunderhunting. R. M. Hawekotte. *Bell Laboratories Record*, v. 31, Dec. 1953, p. 476-480.

Describes recording of noise induced on open-wire telephone circuits by atmospheric static. Reports recorded noise is particularly valuable for comparison of different types of circuits and equipment. Photographs, graphs.

3234* Common-Control Features in Nationwide Dialing. J. B. Newsom. *Bell Laboratories Record*, v. 31, Dec. 1953, p. 481-485.

Presents general description of various items of common-control equipment and integration of this equipment into fast, comprehensive switching system, capable of handling both operator and customer nationwide dialing. Photographs, diagram.

3235* Pulse-Testing TD-2 Antennas. W. C. Warman. *Bell Laboratories Record*, v. 31, Dec. 1953, p. 486-491.

Describes experimental studies conducted to discover effect of objects near antennas on their effective directivity. Technique will be valuable aid in selecting future locations. Photographs, diagrams, maps, oscillograms.

3236* A New Crystal Unit for Broadband Carrier Systems. A. W. Ziegler. *Bell Laboratories Record*, v. 31, Dec. 1953, p. 497-500.

Describes improvements in quartz crystal plates which preserve its valuable characteristics and produce unit that is reliable, economical to manufacture, capable of withstanding reasonably rough handling, and small in size. Photographs, diagrams.

3237 Design Theory of Junction Transistors. J. M. Early. *Bell System Technical Journal*, v. 32, Nov. 1953, p. 1271-1312.

Small signal a.c. transmission characteristics are derived from physical structure and bias conditions. Effects of minority carrier flow and depletion layer capacitances are analyzed. Ohmic spreading resistance of base region of a three dimensional model is approximated. Diagrams.

3238 Application of Digital Computing Techniques to Physics. R. A. Brooker. *British Journal of Applied Physics*, v. 4, Nov. 1953, p. 321-326.

Some computations likely to occur in connection with physical problems are discussed in relation to electronic computers. 21 ref.

3239 Meteor Echo Duration and Radio Wave Length. D. W. R. McKinley. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1121-1135.

Durations of radar echoes from meteors have been observed simultaneously on 9.22 m. and 5.35 m., and also on 9.22 m. and 2.83 m. Tables, graphs. 8 ref.

3240* Microwave Multiplex Techniques. E. J. Rudisuhle. *Communication Engineering*, v. 13, Nov.-Dec. 1953, p. 28-31, 40-41.

Discusses history of multiplexing, basic multiplex methods, details of frequency division techniques, and signaling. Graphs, diagrams.

3241* Versatile 70 Watts. Ernest F. Hiser, Jr. *CQ Radio Amateurs' Journal*, v. 9, Dec. 1953, p. 15-22.

Describes radio transmitter which features pre-tuned multiplier stages and miniature tubes. Photographs, circuit diagrams.

3242 Electronic Calculator. *Electrical Manufacturing*, v. 52, Dec. 1953, p. 108-111.

New IBM Model 607 digital computer is designed for increased storage capacity, more flexible programming, and increased speed. Photographs.

3243* Georgia Power Co. Develops Device for Measuring Small Voltage Variations. R. W. Baker. *Electrical World*, v. 140, Nov. 30, 1953, p. 94-95.

Instantaneous system voltage variations can be accurately measured by using relatively inexpensive electronic circuits in conjunction with a standard oscilloscope and oscillograph. Diagram, graph, oscillographs.

3244 Selective Calling for Radio-Telephone Systems. J. R. Pollard. *Electronic Engineering*, v. 25, Dec. 1953, p. 490-496.

Describes apparatus which enable individual, group, or general calls to be made in radio-telephone systems of the type which use common communication frequencies for a large number of stations. Diagrams, tables.

3245 A Comparison of the Properties of Certain Materials Used in Low-Power Microwave Attenuators. F. A. Benson and R. M. Pearson. *Electronic Engineering*, v. 25, Dec. 1953, p. 502-505.

Tests were made on Morganite, gutta percha, and Bakelite. Graphs, diagrams.

3246 Recent Developments in Ignitrons. G. M. Zins. *Electronics*, v. 26, Dec. 1953, p. 135-137.

Describes applications in locomotive drives, strip mill drives, and Al pot lines.

3247* What Design Engineers Need to Know About the NTSC Color Television Standard. Donald G. Fink. *Electronics*, v. 26, Dec. 1953, p. 138-150.

Point-by-point discussion of the 22 color standards and reasons why specific techniques and numerical values were chosen for transmission of color signals without disturbing reception on a monochrome receiver. Tables, graph, diagram. 5 ref.

3248* Press Control Speeds Auto Body Production. Anthony P. DiVencenzo and Charles E. Robinson. *Electronics*, v. 26, Dec. 1953, p. 154-157.

Thyratron regulator controls drawing-press motors to obtain rapid accelerations and most efficient operating cycle. Diagrams, graphs, photographs.

3249* Modified Preamplifier Improves Movie Telecasts. K. B. Benson. *Electronics*, v. 26, Dec. 1953, p. 166-169.

Feedback "cascode" iconoscope preamplifier used with existing cameras enhances quality of motion-picture programs in television broadcasting by reducing noise and permitting use of low beam currents. Graphs, diagrams, photographs. 6 ref.

3250* Transistors: Theory and Application, Switching Circuits Using the Transistor. Abraham Coblenz and Harry L. Owens. *Electronics*, v. 26, Dec. 1953, p. 186-191.

Negative resistance characteristics of point-contact transistors provide wide variety of switching applications such as counters, computers, relaxation oscillators of all kinds, and data transmission systems. Diagrams, graphs. 12 ref.

3251* Measurement of L. F. Response of Servo-Mechanism Components. E. J. P. Long. *Engineer*, v. 196, Dec. 4, 1953, p. 722-725.

Describes design and operation of an apparatus for producing a sinusoidal signal in frequency range 0.5 to 20 cycles per sec. together with suitable equipment for measuring attenuation and phase shift at these frequencies. Photographs, graphs, diagrams. 7 ref.

3252 The Information Theory. Francis Bello. *Fortune*, v. 48, Dec. 1953, p. 136-137, 140, 149-150, 152, 154, 156, 158.

Discusses communication theory including encoding, compression, and transmission. Diagrams, photographs.

3253* Propagation of Microwaves Through a Cylindrical Metallic Guide Filled Coaxially With Two Different Dielectrics. III. S. K. Chatterjee. *Indian Institute of Science Journal*, v. 35, Sec. B, Oct. 1953, p. 149-169.

Mathematical analysis. Tables. 8 ref. (To be continued.)

3254 An Investigation of the Characteristics of Cylindrical Surface Waves. H. M. Barlow and A. E. Karbowiak. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 3, no. 68, Nov. 1953, p. 321-328.

Includes graphs, diagrams. 12 ref.

3255 Surface Waves. H. M. Barlow and A. L. Cullen. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 3, no. 68, Nov. 1953, p. 329-341; disc., p. 341-347.

Presents a unified picture of theory of various forms of surface waves and a clear physical interpretation of their behavior. Graphs, diagrams. 13 ref.

3256 Some Recent Work in France on New Types of Valves for the Highest Radio Frequencies. R. Warnecke and P. Guenard. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 3, no. 68, Nov. 1953, p. 351-362.

Includes graphs, photographs, diagrams. 16 ref.

3257 The Dependence of Mutual Conductance on Frequency of Aged Oxide-Cathode Valves and Its Influnce on Their Transient Response. J. R. Tillman, J. Butterworth, and R. E. Warren. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 4, no. 5, Oct. 1953, p. 8-15.

Includes graphs, tables. 10 ref.

3258 Analysis of a Transmission-Line Type of Thermionic-Amplifier Valve. I. A. D. Lewis. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 4, no. 5, Oct. 1953, p. 16-24.

An analysis is made, using circuit theory, of a transmission line consisting of two helices in proximity to an earthed straight conductor. Diagrams. 12 ref.

3259 The Surface-Barrier Transistor. I. Principles of the Surface-Barrier Tansistor. W. E. Bradley. **II. Electrochemical Techniques for Fabrication of Surface-Barrier Transistor.** J. W. Tiley and R. A. Williams. **III. Circuit**

Electronics

Applications of Surface-Barrier Transistors. J. B. Angell and F. P. Keiper, Jr. **IV. On the High-Frequency Performance of Transistors.** Robert Kansas. **V. The Properties of Metal to Semiconductor Contacts.** R. F. Schwarz and J. F. Walsh. *I. R. E., Proceedings,* v. 4, Dec. 1953, p. 1702-1720.

Includes graphs, tables, diagrams.

3260 IRE Standards on Antennas and Waveguides: Definitions of Terms, 1953. *I.R.E., Proceedings,* v. 4, Dec. 1953, p. 1721-1727.

Includes diagrams.

3261 A Germanium N-P-N Alloy Junction Transistor. Dietrich A. Jenny. *I.R.E., Proceedings,* v. 4, Dec. 1953, p. 1728-1734.

Includes graphs, diagrams.

3262 Marine Radar. *Machinery Lloyd (Overseas Ed.),* v. 25, Nov. 21, 1953, p. 96-98.

Dscribes unit capable of long range detection yet providing high definition of short range. Photographs.

3263 Design Trends of Powdered Iron Core Inductances as Used in the Electronics Industry. Bernard Goldsmith. *Metal Powedr Association, Proceedings,* 1953, p. 14-21.

Discusses electrical specifications, temperature co-efficient, and strength of cores.

3264 Electronic Literature Searching. Clyde Williams. *Monthly Business Review,* v. 35, Dec. 1953, p. 11.

Recent developments in automatic searching equipment are reported, including applications, limitations, and advantages of such instruments.

3265 "Obstacle-Gain" VHF Transmission. *National Bureau of Standards, Technical News Bulletin,* v. 37, Dec. 1953, p. 177-179.

Describes advantageous use of topography of region in setting up transmission installations. Graphs.

3266* Remote Control. (Russian.) F. E. Temnikov. *Nauka i Zhizn,* v. 20, no. 7, July 1953, p. 29-32 + 1 plate.

Presents a general discussion on automation and telemetering. Diagrams, photographs.

3267* The Principle of the Magnetic Recording and Reproduction of Sound. W. K. Westmijze. *Philips Technical Review,* v. 15, Sept. 1953, p. 84-96.

Includes diagrams, graphs, micrograph, photograph.

3268 Drift Mobilities in Semiconductors. I. Germanium. M. B. Prince. *Physical Review,* v. 92, ser. 2, Nov. 1, 1953, p. 681-687.

Drift mobility of holes in *n*-type Ge and electrons in *p*-type Ge were measured as functions of impurity concentration and temperature.

3269 Electronic Polarizabilities of Ions in Crystals. Jack R. Tessman and A. H. Kahn. *Physical Review,* v. 92, ser. 2, Nov. 1, 1953, p. 890-895.

A set of electronic polarizabilities has been obtained from a least-squares fit of experimental refraction data using simple additivity and a Lorentz factor of $4\pi/3$. Except for fluorides, electronic polarizability values of alkali-halide crystals calculated from this set agree with experimental data within 3%. Tables, graphs. 10 ref.

3270* Microwaves for Pipeliners. XII. Maintenance. C. B. Lester. *Pipe Line News,* v. 25, Dec. 1953, p. 33-34, 36, 38, 40.

After a microwave system is completed, its proper maintenance is deciding factor in determining operating costs and system useability.

3271* Manufacture of Quartz Crystal Units Precision. K. Landers Boon. *Shell Aviation News,* 1953, no. 184, Oct., p. 18-19.

Description of nature of quartz and manufacturing processes through which it passes. Photographs.

3272 A New Hand Carried Transmitter-Receiver. Stanley Cutler and George Brownstein. *Tele-Tech,* v. 12, Dec. 1953, p. 72-73, 158-159, 164.

Describes compact light-weight unit, sensitive within one mile service range. Diagram, photograph.

3273 Transistor I-F Amplifiers. J. R. Nelson. *Tele-Tech,* v. 12, Dec. 1953, p. 68-69, 166-169.

Presents practical design criteria for circuits operating below 500 kc. Grounded emitter and base types employing junction transistors are analyzed. Graphs, diagrams. 3 ref.

3274* Transistors. XI. Conclusion: Frequency Response Small Voltage Variations. R. W. Baker. *Electrical World,* v. 59, Dec. 1953, p. 568-570.

Includes circuit diagrams.

3275* Two-Band Transmitter Receiver. G. P. Anderson. *Wireless World,* v. 59, Dec. 1953, p. 593-598.

Describes low power equipment for portable and fixed stations. Photographs, circuit diagrams.

Books and Miscellaneous Publications

3276 Theory of Time-Dependent Rutpure and Interpretation of Some Stress-Rupture Data. D. N. Frey. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128, p. 131-137; disc., p. 138-141. 1952. American Society for Testing Materials, Philadelphia. (TA46 Am35st)

Covers effect of precipitation upon rupture time and ductility and effect of circumferential notches on elevated temperature rupture strength. Graphs, micrographs. 11 ref.

See also:

2925 (glass in the electronics industry)
3298 (economics of printed circuits)
3486 (effect of auroras on communications)
3512 (electronic color scanner)
3600 (mechanized production of electronic products)
3650 (Al communication systems)
3892 (electronic controls in tubing manufacture)
3948 (band structure in semi-conductors)
3979 (traveling wave electron accelerators)
4268 (soldering techniques for printed circuits)
4281 (electronic welding controls)

ENGINEERING ECONOMICS

3277* Vertical Equilibrium Under Pure Quality Competition. Lawrence Abbott. *American Economic Review,* v. 43, Dec. 1953, p. 826-845.

Includes graphs. 13 ref.

3278* An American Engineer Photo Story. Alberto Hernandez. *American Engineer,* 1953, Dec., p. 13-17.

Puerto Rico as a new frontier for United States industry and a new proving ground for engineering careers. Photographs.

3279* 1954—A Good Year for Metalworking. *American Machinist,* v. 97, "Mid-November" 1953, p. 17-32.

Presents metalworking statistics for period 1939 to 1953 and gives outlook for 1954. Graphs, tables.

3280 The Problem of Fluorspar Supply. Robert E. Holmes. *Battelle Technical Review,* v. 2, Dec. 1953, p. 133-135.

Discusses uses of fluorspar and problems of its production. Reports increased consumption. Predicts continued demand.

3281 The Modern Pharmaceutical Industry. Markets for Pharmaceuticals. John F. Bohmfalk, Jr. *Chemical and Engineering News,* v. 31, Nov. 30, 1953, p. 5006-5012.

Antibiotics and vitamins are reported to be in over-supply; together with vitamins they account for bulk of ethical drug sales. Many drug firms channel 25% or more of total sales abroad. Graphs, tables.

3282* Public Utilities—Fair Rates for Customers and Investors. Robert P. Briggs. *Edison Electric Institute Bulletin*, v. 21, Dec. 1953, p. 463-468.

Discusses effects of government regulation and projects and inflation on costs.

3283 What Price Lead, 1953—1975? William P. Shea. *Engineering and Mining Journal*, v. 154, Dec. 1953, p. 77-82.

Presents survey of world's present and future use of lead; probable sources of supply; and present and future costs of production. Graph, tables.

3284 Conservation of Water in the Kraft Pulp and Paper Industry. H. W. Gehm and M. A. Moggio. *Louisiana State University Engineering Experiment Station Bulletin* no. 38, 1952, p. 1-11. (TP1 L93b)

Development of new waste water handling equipment and improved design of existing equipment permitted wider application of water re-use principle and lower process water losses. Tables. 2 ref.

3285 Capacity of Natural Waters to Assimilate Wastes. Hayse H. Black and Gerald N. McDermott. *Louisiana State University Engineering Experiment Station Bulletin* no. 38, 1952, p. 12-37. (TP1 L93b)

Pollution effects, elements influencing utilization, and self purification phenomena are described. Basic concepts of water pollution abatement are discussed. 23 ref.

3286 Water Consrevation in Petroleum Production. Thomas N. Winfiele. *Louisiana State University Engineering Experiment Station Bulletin* no. 38, 1952, p. 38-45. (TP1 L93b)

Discusses various Louisiana State Dept. of Conservation regulations of produced water in connection with oil and gas production and protection of fresh water sands from contamination. Tables.

3287 Conservation of Water in Petroleum and Petro-Chemical Industries. J. E. Miller, P. P. Entrikin, and F. J. Geiser. *Louisiana State University Engineering Experiment Station Bulletin* no. 38, 1952, p. 46-53. (TP1 L93b)

Studies were made of various types of water, most efficient use for each type, and possibilities of re-using water. Diagrams, table.

3288 Water Usage and Conservation in the Louisiana Sugar Industry. Arthur G. Keller. *Louisiana State University Engineering Experiment Station Bulletin* no. 38, 1952, p. 54-58. (TP1 L93b)

Problems of water supply and waste disposal are described.

3289 Program for the Maximum Utilization of Louisiana River Basins for Industrial Development. Frank J. Coogan and K. E. Biglane. *Louisiana State University Engineering Experiment Station Bulletin* no. 38, 1952, p. 59-78. (TP1 L93b)

Discusses measures by the Stream Control Commission to maintain best water quality consistant with natural characteristics of the streams and to judge ability of the stream to handle waste discharge without materially changing required quality. Tables. 7 ref.

3290 Plant Location as Influenced by Water Resources and Waste Disposal. C. R. Lose. *Louisiana State University Engineering Experiment Station Bulletin* no. 38, 1952, p. 79-84. (TP1 L93b)

Discusses various factors of water resources for the American Cyanamid Company and problems of satisfactory waste disposal.

3291* Oscilloscope Reduces Cost of Jig Grinding Operations. W. W. Rea. *Machinery*, v. 60, Dec. 1953, p. 201-203.

Includes diagrams, photographs.

3292* Decade of Progress. 1942-1952. *Mechanization*, v. 17, Nov. 1953, p. 83-89.

Describes developments in the coal industry. Includes statistics on progress in mechanization, strip mining, preparation, and safety.

3293 Nonferrous Metal Industries in Yugoslavia. Joseph Zimmerman. *Metals (Daily Metal Reporter Monthly Supplement)*, v. 24, Nov. 1953, p. 7-9, 19.

Presents statistics on production and consumption. Tables.

3294* The Light Metals Market. *Modern Metals*, v. 9, Nov. 1953, p. 85-87.

Includes tabulation by states of producers, fabricators, foundries, die casters, and product manufacturers for Al, Mg, and Ti.

3295 Agriculture During 1953. *Monthly Business Review*, v. 35, Dec. 1953, p. 6-9.

Discusses price trends; output and demand for farm products; farm income and expenditures; and farm debt. Graphs.

3296 Preparing Preliminary Job Estimates. W. W. Bond. *Oil and Gas Journal*, v. 52, Dec. 14, 1953, p. 106-107, 127, 129.

Includes charts for quick plant costimating.

3297* Sales Expense. Clarence A. Bostwick. *Photoengravers Bulletin*, v. 43, Nov. 1953, p. 99-113.

Presents analysis of distribution costs. Tables, graphs.

3298 The Economics of Printed Wiring. Robert L. Swiggett and James F. Carberry. *Tele-Tech*, v. 12, Dec. 1953, p. 78-81, 177-178.

Discussion is limited to type of printed wiring or printed circuitry which produces a metal conductor pattern on an insulator, usually a laminated plastic, by process of etching or electro-plating. Photographs.

See also:

3501 (cost accounting in a lithographic plant)
3628 (costs of civil aircraft)
3640 (costs of Ti processing)
3652 (Al production markets)
3687 (steel making costs)
3705 (costs of producing pig iron)
4051 (effective use of man power)
4296 (economics of paper industry)

FLUID MECHANICS

3299* Velocity Curves in the Boundary Layer on a Flat Plate in Compressible Fluid. (French.) Gérard Gontier and André Martinot-Lagarde. *Comptes rendus*, v. 237, no. 17, Oct. 28, 1953, p. 966-968.

Shows that curves in a laminar or turbulent boundary layer up to M_0 equal to or less than 0.8 when M varies linearly over the plate are the same as in an incompressible fluid. Graphs. 6 ref.

3300* Surface Tension of Cationic Surface Agent Solutions. (French.) Constantin Paparoditis and Jean Guastalla. *Comptes rendus*, v. 237, no. 17, Oct. 28, 1953, p. 977-979.

Describes a method in which slope of the tangent enters at origin of tension curve. Graphs.

3301* Influence of Slit Jets on the Intensity of Cavitation Erosion. (Russian.) K. K. Shal'nev. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1043-1045 + 1 plate.

Tests were carried out on round specimens 6 mm. in diameter. Concludes that jet slits will protect hydraulic installations. Diagram, table, micrographs.

3302 Pressure Loss of Air Flowing Through 45-Degree Wooden Louvers. P. R. Cobb. *Heating, Piping & Air Conditioning*, v. 25, Dec. 1953, p. 123-128.

Paper evaluates effect of different variables on pressure loss in 45° wooden louvers of common construction encountered in practice. Photographs, diagrams, graphs, tables. 5 ref.

3303 Flow and Fan. Principles of Moving Air Through Ducts. XII. Fan Operation and Control. C. Harold Berry. *Heating and Ventilating*, v. 50, Dec. 1953, p. 102-107.

Includes discussion of fan stability and volume control following analysis of factors affecting abnormal operation of a fan. Diagrams, graphs.

Fluid Mechanics

3304 Velocity Distribution Between Parallel Plates. W. G. Schlinger and B. H. Sage. *Industrial and Engineering Chemistry,* v. 45, Dec. 1953, p. 2636-2639.

Velocity distributions and deficiencies are computed for air at various Reynolds numbers. Tables, diagrams. 10 ref.

3305 Applications of the Constant Temperature Hot-Wire Anemometer to the Study of Transient Air Flow Phenomena. James C. Laurence and L. Gene Landes. *Instruments,* v. 26, Dec. 1953, p. 1890-1894.

Constant temperature hot-wire anemometer uses a negative feedback voltage to provide continuous compensation for lag in response of the hot-wire to fluctuations in air-flow. Graphs, diagrams. 6 ref.

3306 Installation and Maintenance of Orifice Meters. W. D. Straight. *Instruments,* v. 26, Dec. 1953, p. 1895-1897.

Proper installation, inspection, and maintenance of orifice fittings, regulators, and differential gages are necessary for accurate measurements. Maintenance details are presented.

3307 Flow Tubes. E. W. Randle. *Instruments,* v. 26, Dec. 1953, p. 1879, 1904-1905.

Flow tubes differ from orifices and Venturi tubes in using impact pressure, making possible high differentials with little throat contraction, and reduced head loss. Diagrams.

3308* Motion of Solid Particles in a Gas Suspension. (Russian.) G. N. Khudiakov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 7, July, p. 1022-1034 + 1 plate.

Coefficients of resistance of twisting and advancing particles is considerably less than that obtained during gas flow around a motionless sphere. Tables, graphs, diagrams. 5 ref.

3309* Structure of Flow Behind a Plate in an Ideal Liquid. (Russian.) M. S. Fomicher. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 8, Aug., p. 1157-1165 + 2 plates.

Discusses instantaneous distribution of flow velocities behind the plate. Describes influence of plate size on degree of development and distance of propagation of vortices in plane cross section of turbulent flow. Tables, graphs, micrographs.

3310* Modeling of the Phenomena of Nonsteady Wave Motion in Flow With and Without Pressure. (Russian.) I. V. Egiazarov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 10, Oct., p. 1417-1427.

Criteria and equations are developed. Discusses modeling and conditions to be observed. 13 ref.

3311* Generalized Energy Form of the Integral Relation in the Theory of the Boundary Layer. (Russian.) L. I. Kudriashev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 10, Oct., p. 1440-1443.

Shows that hydrodynamic and thermal equations are special cases. Graph.

3312* The Compressible Laminar Boundary Layer With Arbitrary Pressure and Surface Temperature Gradients. Deane N. Morris and John W. Smith. *Journal of Aeronautical Sciences,* v. 20, Dec. 1953, p. 805-818.

Method has been developed which is recommended both for its unusually wide range of application and for ease with which numerical calculations can be carried out. Graphs. 26 ref.

3313* Some Stall and Surge Phenomena in Axial-Flow Compressors. Merle C. Huppert and William A. Benser. *Journal of the Aeronautical Sciences,* v. 20, Dec. 1953, p. 835-845.

Includes graphs, diagrams. 3 ref.

3314 Here's a New Flow Meter Design. Andre L. Jorissen, Sander L. Wise, and James M. Symons. *Petroleum Processing,* v. 8, Dec. 1953, p. 1870-1873.

Differential pressure device which is described provides high accuracy with low cost construction and easy installation. Diagrams, graphs, tables. 6 ref.

3315 Low-Speed Drag of Cylinders of Various Shapes. Noel K. Delany and Norman E. Sorensen. *U. S. National Advisory Commmittee for Aeronautics, Technical Note* 3038, Nov. 1953, 22 p. (TL570 Un3t)

Investigation was conducted to find approximate variation of drag coefficient with Reynolds number of several cylinders having different cross-sectional shapes. Graphs, photographs, table. 7 ref.

3316 Experimental Investigation of the Effects of Cooling on Friction and on Boundary-Layer Transition for Low-Speed Gas Flow at the Entry of a Tube. Stephen J. Kline and Ascher H. Shapiro. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3048, Nov. 1953, 65 p. (TL570 Un3t)

Effect of cooling on boundary-layer transition in steady flow of air in the entrance of a smooth round tube has been investigated experimentally. Graphs, diagrams, table. 27 ref.

3317 An Analytical Investigation of the Effect of the Rate of Increase of Turbulent Kinetic Energy in the Stream Direction on the Development of Turbulent Boundary Layers in Adverse Pressure Gradients. Bernard Rashis. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3049, Nov. 1953, 30 p. (TL570 Un3t)

A general integral form of boundary-layer equation was derived. It includes Reynolds normal-stress term. Graphs, tables. 14 ref.

See also:
2928 (fluid flow in a glass plant)
3604 (control valves for high air-mass flows)

FOOD TECHNOLOGY

3318* Home-Freezing vs. Home-Canning of Peas. Palatability, Ascorbic Acid, Total Solids, and Color. Erna Bamford and Faith Fenton. *American Dietetic Association, Journal,* v. 29, Dec. 1953, p. 1221-1225.

Object of study was to determine relative merits of steam and boiling-water blanching prior to freezing and of hot- and cold-packs in canning. Tables. 11 ref.

3319* Edible Spreads of Wide Plastic Range From Vegetable Oils and Monoglycerides. Edwin P. Jones, Herbert J. Dutton, and John C. Cowan. *American Oil Chemists' Society, Journal,* v. 30, Dec. 1953, p. 609-610.

Much needs to be done to improve "mouth feel," "get-away," synthetic butter flavors, and oxidative stability. These problems are areas of current investigations. Tables, graph.

3320* Alkaline Phosphatase of Milk. I. Association of the Enzyme With a Particulate Lipoprotein Complex. II. Purification of the Enzyme. R. K. Morton. *Biochemical Journal,* v. 55, Dec. 1953, p. 786-800.

Includes graphs, tables. 50 ref.

3321* Unicellular Algae as a Source of Food. M. J. Geoghegan. *Discovery,* v. 14, Dec. 1953, p. 379-383.

Includes photograph, photomicrographs.

3322* They Took the "Plod" Out of Fresh-Cheese Making. Arthur V. Gemmill. *Food Engineering,* v. 25, Dec. 1953, p. 78-79, 176.

A new process reduces labor and provides greater sanitation. Photographs.

3323* "Last Word" Yeast Plant. *Food Engineering,* v. 25, Dec. 1953, p. 80-82.

Describes preparation of raw materials, fermentation, process control, and packaging. Photographs, diagram.

3324* Histological Investigations of Texture in Apples. I. Composition and Influence of Heat on Structure. II. Structure and Intercellular Spaces. R. M. Reeve and L. R. Leinbach. *Food Research,* v. 18, Nov.-Dec. 1953, p. 592-617.

Effects of heat and other processing variables were determined. Micrographs, tables. 35 ref.

3325* Vitamin Retention in Peas and Lima Beans After Blanching, Freezing, Processing in Tin and in Glass, After

Storage and After Cooking. N. B. Guerrant and Mary B. O'Hara. *Food Technology*, v. 7, Dec. 1953, p. 473-477.

Reports effects of current methods of preservation and cooking. Tables. 29 ref.

3326* Time-Temperature Relationships for Heat Inactivation of Pectinesterase in Citrus Juices. C. D. Atkins and A. H. Rouse. *Food Technology*, v. 7, Dec. 1953, p. 489-491.

Investigations were made using Parson Brown, Pineapple, and Valencia orange juices. Tables. 4 ref.

3327* Economic Adjustments That Have a Special Bearing Upon Food Supplies and Public Health. John D. Black. *Food Technology*, v. 7, Dec. 1953, p. 502-504.

Covers population and food supply balance; projecting food consumption and production into the future; food consumption and income; where the food technologist comes in; and food surplus considerations. Tables.

3328* Apple Scald. I. Production and Control in the Laboratory. Joseph Kuc, R. E. Henze, and F. W. Quackenbush. **II. Use of Alkaline Permanganate for Control in Refrigerated Storage.** Joseph Kuc, R. E. Henze, C. E. Baker, and F. W. Quackenbush. *Journal of Agricultural and Food Chemistry*, v. 1, Nov. 25, 1953, p. 1104-1109.

Includes tables, diagrams, graphs, photographs. 18 ref.

3329* Identification of Enzyme-Desugarized Egg Solids. Don Scott. *Journal of Agricultural and Food Chemistry*, v. 1, Nov. 25, 1953, p. 1109-1111.

Egg solids prepared through use of glucose oxidase and catalase for desugarization are identified by presence of gluconic acid in significant quantities. Tables. 4 ref.

3330 The B-Vitamins in Wheat: The Unique Aleurone Layer. J. J. C. Hinton, F. G. Peers, and B. Shaw. *Nature*, v. 172, Nov. 28, 1953, p. 993-995.

Distribution of nutrients in grain was investigated. Tables, photographs. 13 ref.

3331* Supplement to Present Knowledge in Nutrition. *Nutrition Reviews*, v. 11, Dec. 1953, p. 353-361.

Reviews recent literature on carbohydrates, minerals, and vitamins. Includes numerous references.

3332* Food Resources of the Sea. Methods of Production and Harvesting. Ronald Currie. *Times Science Review*, 1953, Winter, p. 10-11, 13.

A general review. Photographs, map.

See also:

2880 (sauerkraut fermentation)
2882 (heatless sterilization as a preservative)
2890 (formation and secretion of riboflavin)
2893 (sorbic acid as a mold inhibitor)
3031 (coffee oil and its component fatty acids)
3182 (electrical equipment)
3288 (water conservation in sugar industry)
3323 (processing of yeast)
3608 (automation in food industry)
3988 (sterilization of food by γ radiation)
4001 (sterilization of food by radiation)
4047 (processing of dry fruit)
4149 (control of exhaust fumes from trucks used in food handling)
4180 (space heating for food storage warehouses)

FUELS AND COMBUSTION

3333* Kinetics of the Combustion Wave. Raymond Friedman. *American Rocket Society, Journal*, v. 23, Nov.-Dec. 1953, p. 349-354, 374.

Discusses theoretical concepts of one-dimensional steady-state combustion waves. Although a brief review of fundamentals of detonation is included, main emphasis is on deflagration. Diagrams. 33 ref.

3334* The Influence of Sulphuric Acid Upon the Dew Point of Combustion Gases. George A. Fearn, Jr. and William Tessin. *American Society of Naval Engineers, Journal*, v. 65, Nov. 1953, p. 753-763.

Includes graphs, diagrams, tables. 12 ref.

3335* Fuel and Society. G. E. Foxwell. *Australasian Engineer*, 1953, Oct., p. 83-88.

Presidential address, 1953, delivered before the Inst. of Fuel, London, Apr. 22, 1953. Table, photographs. (To be continued.)

3336* Flame Control for Boiler Installations With Injected Fuel. (Dutch.) N. A. de Gier. *Bedrijf en Techniek*, v. 8, no. 183(18), *(Electronica section)*, v. 6, no. 130, Aug. 29, 1953, p. 137-139.

Describes an electron-ray oscillograph used to observe or control flame in large boiler combustion chambers. Diagrams.

3337* Research and Development on the Conversion of Coal to Gas, Liquid Fuels, and Bulk Organic Chemicals. H. H. Storch. *Canadian Mining and Metallurgical Bulletin*, v. 46, no. 499, Nov. 1953, p. 690-694; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 61, 1953, p. 376-380.

Includes tables. 11 ref.

3338 Design of Oil and Combination Burners. *Ceramic Industry*, v. 61, Nov. 1953, p. 46, 49, 50, 53.

Discusses burners specially designed for every industrial need. Diagrams, photographs.

3339* Are the Studies Concerning the Reactivity of Coke-Type Fuels Now Industrially Usable? (French.) H. Cassan. *Chaleur & Industrie*, v. 34, no. 340, Nov. 1953, p. 315-326.

Discusses scientific and theoretical characteristics including analysis of various extrinsic and intrinsic factors of reactivity. Table. (To be continued.)

3340* Fuels and Their Combustion. V. (French.) Roger Martin. *Chaleur & Industrie*, v. 34, no. 340, Nov. 1953, p. 327-336.

Discusses variations of percentage of carbon dioxide gas of neutral fumes from a given fuel. Table. (To be continued.)

3341* Underground Gasification of Coal. (Spanish.) *Combustibles*, v. 13, no. 67, May-June 1953, p. 176-188.

Research done in Russia, Italy, United States, England, and Belgium is reviewed. Table, diagrams. (To be continued.)

3342* Sulfur in Fuels and Dewpoint of Flue Gases. W. Gumz. *Combustion*, v. 25, Nov. 1953, p. 53-54.

Discusses factors contributing to difficulty of calculating H_2SO_4 formation in stoker furnaces. Graphs. 26 ref.

3343* Calculation of Available Heat From Combustion of Solid and Liquid Fuels. (Russian.) M. B. Ravich. *Doklady Akademii Nauk SSSR*, v. 90, no. 6, June 21, 1953, p. 1031-1034.

Experiments and theory showed good agreement. Tables. 5 ref.

3344* Investigation of Condensed Aromatic Hydrocarbons of Shale Cracked Kerosene. (Russian.) Z. T. Zonova. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 65-68.

Cracking was carried out 450 C with volumetric velocity of 0.5 per 30 min. cycle. Tables. 10 ref.

3345* New Firing Method Cuts Power Cost. S. T. MacKenzie. *Electrical World*, v. 140, Dec. 14, 1953, p. 130-133.

Cyclone furnace is credited with reducing original investment in plant equipment and making maintenance simpler and less expensive.

3346* Safety Mechanism for Oil Burners. *Engineering*, v. 176, Nov. 13, 1953, p. 634.

Describes equipment to prevent leakage of oil and to prevent discharge of unatomized oil into the combustion chamber. Photographs.

3347* The Gasification of Residuum. (French.) Henri Guillon. *Flamme et Thermique*, v. 7, no. 61, Oct. 1953, p. 13-22, 31-33.

Reviews reasons for the underlying principles and goals. Describes theory of gasification and industrial plants. Outlines applications and future possibilities. Tables, graph, diagrams.

Fuels and Combustion

3348* State of Homogeneous-Hetergeneous Combustion Theory. (Russian.) A. S. Predvoditelev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 5, May, p. 705-707.

Reviews work of Semenov, Khitrin, and Chukhanov. 3 ref.

3349* Basic Problems of the Modern Theory of Homogeneous Combustion of Uniform Gas System. (Russian.) N. N. Semenov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 5, May, p. 708-729.

Discusses self and chain ignition; normal velocity and limits of flame propagation; quick combustion; and detonation. 30 ref.

3350* Coal Combustion at Low Temperatures. (Russian.) V. I. Blinov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 5, May, p. 736-740.

Causes of different combustion activity of coals are discussed. Coals which underwent coking differ only in degree of porosity and purity. Graph. 8 ref.

3351* Calculation of Heat Contained in Combustion Products During Combustion of Gaseous Fuels. (Russian.) M. B. Ravich. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 6, June, p. 856-864.

Calculates losses of physical heat without resorting to calculation of heating value of gas, volume of combustion products, and their specific heats. Tables.

3352* Temperature Dependence of Coal Combustion. (Russian.) V. S. Veselovskii and E. A. Terpogosova. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 6, June, p. 905-909.

Experiments show that temperature dependence is caused by unequal acceleration of formation and splitting away of oxidizing atomic groups in coal structure. Graphs, tables. 3 ref.

3353* Study of Carbon Combustion Process in a Coal Layer. (Russian.) N. A. Karzhavina. *Izvestiia Akademii Nauk SSSR, Otdelenie Teknicheskikh Nauk*, 1953, no. 7, July, p. 969-991.

Discusses influence of blast velocity, oxygen concentration in the blast, and temperature on gas formation. Graphs, tables. 8 ref.

3354* Zonal Calculation Method of Radiation Heat Exchange in Combustion Chamber. (Russian.) Iu. A. Surinov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 7, July, p. 992-1021.

Method is applicable to systems of gray bodies partitioned by a diathermic medium. Diagrams. 9 ref.

3355* Effect of Pressure on the Process of Semicoking of Solid Fuels. (Russian.) A. B. Chernyshev, V. S. Al'tshuler, and G. A. Shafir. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 10, Oct., p. 1393-1400.

Tests were made in N_2 atmosphere at pressures up to 100 atmospheres. Pressure variation was found to affect secondary reactions in the vapor phase. Diagrams, graph, tables.

3356* Certain Regularities in the Predetonation Region of Flame Propagation. (Russian.) V. A. Popov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 10, Oct., p. 1428-1439 + 1 plate.

Shows that vibrations may be explained by interaction of shock wave with flame front. Tables, graphs, photographs. 5 ref.

3357* Gas Formation During the Combustion of Powdered Coal Layers. (Russian.) E. S. ,Golovina. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 10, Oct., p. 1444-1451.

Tests were made on rate of combustion of closely sized fractions at 247 to 700 C with air speed of 0.5 cm. per sec. Graphs, diagram. 2 ref.

3358* Atomization and the Performance of Oil Burning Equipment. C. S. Darling. *Mechanical World and Engineering Record*, v. 133, Nov. 1953, p. 486-490.

Includes diagrams. 8 ref.

3359 Methods for Production of "Synthesis Gas" From Natural Gas Hydrocarbons. Arch L. Foster. *Petroleum Engineer*, v. 25, Dec. 1953, p. C3-C4.

Includes diagram, table. 4 ref.

3360* Ash Determination in Low-Ash Coke. (Polish.) A. Grossman and D. Marie. *Przemysl Chemiczny*, v. 9, no. 8, Aug. 1953, p. 407-409.

Describes method of preparing samples. Results obtained determine suitability of coke substances for manufacturing carbon electrodes. Table.

3361 For Cheaper Heats Budget BTU'S. M. F. Hall. *Steel*, v. 133, Dec. 14, 1953, p. 130, 134, 137.

Automatic control systems keep tight rein on fuel consumption. Saves refractory roofs on open-hearth furnaces by avoiding exposure to excessively high temperatures. Photographs.

3362* Classification of Fields of Mill Cut Peat According to Its Tendency to Self-Ignition. (Russian.) Z. P. Kuzhman. *Torfianaia Promyshlennost*, v. 30, no. 9, Sept. 1953, p. 5-7.

Three classifications are discussed. Tables.

3363* Certain Errors in Theoretical Problems of Peat Drying. (Russian.) N. M. Topol'nitskii. *Torfianaia Promyshlennost*, v. 30, no. 9, Sept. 1953, p. 22-25.

Critical discussion on effect of meterological factors is presented. 3 ref.

Books and Miscellaneous Publications

3364 Limits of Inflammability. Alfred C. Egerton. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 4-13. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Describes recent work on standard limits and conclusions derived. Considers some of the factors influencing limits and determination of limits under conditions other than standard. Diagrams, graphs, tables. 27 ref.

3365 The Problem of Ignition. Guenther Von Elbe. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 13-20. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Survey does not cover existing literature comprehensively but is a selection of material that appears most instructive at this time. Graphs, tables. 18 ref.

3366 Methods of Measuring Burning Velocities. J. W. Linnett. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 20-35. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

In this report methods used are surveyed. An attempt is made to assess relative merits of different procedures. Graphs, photographs, diagram, table. 59 ref.

3367 The Structure of Laminar Flames. Melvin Gerstein. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 35-43. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Surveys present status of knowledge of structure of laminar flames. Diagrams, photographs. 35 ref.

3368 Instability Phenomna in Combustion Waves. George H. Markstein. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 44-59. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Instability phenomena, characterized by spontaneous breakup of combustion waves into "cells" or "flamelets", are now known to occur in a great variety of combustible mixtures under easily attainable experimental conditions. Graphs, diagrams, photographs, table. 60 ref.

3369 Open Turbulent Flames. Béla Karlovitz. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 60-67. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Presents a review of studies and experiments of the last 15 years and a concise picture of our current knowledge of turbulent flames. Photographs, graphs, diagrams.

3370 Quenching, Flash-Back, Blow-Off—Theory and Experiment. Kurt Wohl. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 68-89. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, tables, diagrams. 46 ref.

3371 Flame Stabilization by Bluff Bodies and Turbulent Flames in Ducts. J. P. Longwell. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 90-97. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, diagram, table.

3372 Burning in Laminar and Turbulent Fuel Jets. H. C. Hottel. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 97-113. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, diagrams, photograph. 28 ref.

3373 Ignition by Condenser Sparks. Regions of Flammability of Ethane, Propane, *n*-Butane and *n*-Pentane. P. Laffitte and R. Delbourgo. Paper from FOURTH INTERNATIONAL SMPOSIUM ON COMBUSTION. p. 114-126. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, diagrams. 2 ref.

3374 Investigation and Interpretation of the Flammability Region for Some Lean Hydrocarbon-Air Mixtures. Dorothy M. Simon, Frank E. Belles, and Adolph E. Spakowski. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 126-137; disc., p. 137-138. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, diagrams, tables. 20 ref.

3375 Observations of the Ignition and Incipient Flame Growth in Hydrocarbon-Air Mixtures. J. S. Arnold and R. K. Sherburne. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 139-143. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes photographs, graphs, diagram. 7 ref.

3376 Propagation of Incipient Spark-Ignited Flames in Hydrogen-Air and Propane-Air Mixtures. H. L. Olsen, E. L. Gayhart, and R. B. Edmonson. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 144-148. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes photographs, graphs. 5 ref.

3377 Effect of Ultrasonic Waves on Flame Propagation and Spark Ignition. Seiichiro Kumagai, Tadami Sakai, and Itsuro Kimura. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 148-151. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Promotion of flame propagation by ultrasonic waves was observed photographically using a closed vessel, an open tube, and a Bunsen burner. Diagrams, photographs, graph, table.

3378 Heat Transfer in Hot Wire Ignition. Elwyn Jones. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 151-157. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, diagram, table. 11 ref.

3379 Thermal Theory of Solid-Propellant Ignition by Hot Wires. David Altman and Arthur F. Grant, Jr. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 158-161. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Objective of present research was to show that, if a set of experiments can be designed with well-defined boundary conditions, a mathematical solution of heat-conduction equation incorporating idea of ignition temperature will lead to a satisfactory prediction of data. Graph, diagram. 6 ref.

3380 The Development of Combustion and Explosion in Liquids and Solids. F. P. Bowden. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 161-172. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Deals with propagation of low velocity detonation in secondary explosives; ignition and propagation of combustion and explosion in azides; and initiation and combustion of gunpowder. Photographs, tables. 41 ref.

3381 Thermal Theory of a Laminar Flame Front Near a Cold Wall. Theodore von Kármán and Gregorio Millán. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 173-177. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, table. 3 ref.

3382 On the Structure of Stationary Flames. Maurice Roy. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 178-182. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes diagrams.

3383 The Existence and Stability of Simple, One-Dimensional, Steady-State Combustion Waves. John M. Richardson. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 182-189. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Presents a somewhat fragmentary study of a simple mathematical model of a combustion wave. 11 ref.

3384 The Theory of Flames and Detonations. J. O. Hirschfelder, C. F. Curtiss, and Dorothy E. Campbell. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 190-210; disc., p. 210-211. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs. 25 ref.

3385 Mechanism of Formation of CH, C_2, OH and HCO Radicals in Flames. A. G. Gaydon and H. G. Wolfhard. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 211-218. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes tables. 25 ref.

3386 Quantitative Studies of Apparent Rotational Temperatures of OH at Low-Pressures in Emission and Absorption. S. S. Penner. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 218-230; disc., p. 230-231. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Includes graphs, tables. 13 ref.

3387 Activation Energies in High Temperature Combustion. John B. Fenn and Hartwell F. Calcote. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 231-238; disc., p. 238-239. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Examines possibility of determining reaction rate factors, specifically activation energy, of chemical processes from burning velocity measurements. Graphs, tables. 7 ref.

3388 The Combustion of Hydrazine. G. K. Adams and G. W. Stocks. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 239-248. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
Combustion of hydrazine in absence of oxygen seems to be only example of a flame maintained by an exothermic decomposition reaction that has been studied. It is of interest to see whether information on kinetics of homogeneous decomposition reaction at high temperatures can be obtained from combustion measurements. Graphs, tables. 15 ref.

3389 Carbon Formation in the Combustion Wave. George Porter. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 248-252; disc., p. 252. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)
When large carbon particles are formed from smaller molecules polymerization must occur at some stage. Two main theories held at present differ widely and are summarized. 23 ref.

3390 Quantitative Spectrographic Investigation of Flames. P. Ausloos and A. Van Tiggelen. Paper from FOURTH INTER-

Fuels and Combustion

NATIONAL SYMPOSIUM ON COMBUSTION. p. 252-259. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs. 10 ref.

3391 Measurement of the Temperature Profile in a Laminar Flame. Raymond Friedman. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 259-263. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, diagram. 8 ref.

3392 Temperature Distribution in Flame Reaction Zones. G. Dixon-Lewis. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 263-267. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, photograph.

3393 Temperature Profiles in Propane-Air Flame Fronts. R. M. Fristrom, R. Prescott, R. K. Neumann, and W. H. Avery. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 267-274; disc., p. 274. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Determines temperature profile of a propane-air Bunsen flame as a function of composition and ambient pressure. Graphs, photographs, diagrams. 14 ref.

3394 The Estimation of Atomic Oxygen in Open Flames and the Measurement of Temperature. A. Smeeton Leah and N. Carpenter. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 274-285. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, diagrams, tables. 27 ref.

3395 Resistance-Thermometer Measurements in a Low-Pressure Flame. Mitchell Gilbert and John H. Lobdell. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 285-294. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Describes some research in a low-pressure flame on measurements of translational temperature. Diagrams, graph, table. 18 ref.

3396 A Method of Analysis of a Plane Combustion Wave. J. H. Burgoyne and F. Weinberg. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 294-301; disc., p. 301-302. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes, diagrams, photographs. 4 ref.

3397 Flame Velocities of Hydrocarbon-Oxygen-Nitrogen Mixtures. Gordon L. Dugger and Dorothy D. Graab. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 302-310. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables, diagram, photograph. 16 ref.

3398 Burning Velocities of Methane With Nitrogen-Oxygen, Argon-Oxygen, and Helium-Oxygen Mixtures. William H. Clingman, Richard S. Brokaw, and Robert N. Pease. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 310-313. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes tables, graphs. 13 ref.

3399 Some Effects of Inert Diluents on Flame Speeds and Temperatures. Gerry H. Morgan and Walter R. Kane. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 313-320. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Work is part of a long-term program which has as its objectives refinement by reduction and elimination of errors of a method of measuring flame speed; and use of this method to measure normal burning velocities of a variety of gaseous and liquid fuels. Tables, graphs. 6 ref.

3400 Flame Propagation: The Influence of Pressure on the Burning Velocities of Flat Flames. Alfred Egerton and D. Sen. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 321-328. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables, photographs, diagrams. 18 ref.

3401 An Improved Soap Bubble Method of Measuring Flame Velocities. R. A. Strehlow and Joseph G. Stuart. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 329-336. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes, graphs, diagrams, photographs, tables. 4 ref.

3402 The Influence of Atmospheric Oxygen on Bunsen Flames. John F. Byrne. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 345-348. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Results of investigation described show that former concepts of mechanism by which atmospheric air affects Bunsen flames is erroneous, inasmuch as it is shown that none of the oxygen of surrounding air penerates into primary mixture. Photographs.

3403 Studies of Combustion Waves in Solids. R. A. W. Hill and T. L. Cottrell. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 349-352. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper shows that it is possible to obtain a self-propagating reaction between Fe and $KMnO_4$ in pressed pellets which is little affected by ambient atmosphere, that thermal constants of the system are not much changed in the course of reaction, and that a thermal conduction mechanism can account quantitatively for the velocity of propagation. Tables. 5 ref.

3404 Burning-Velocity Measurements on Slot Burners; Comparison With Cylindrical Burner Determinations. J. M. Singer. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 352-358. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Purpose of work was to establish a valid method of measuring burning velocities, using the Bunsen-burner technique. Photographs, tables, graphs. 12 ref.

3405 Closed-Vessel Hydrogen-Air Explosions at High Pressures. J. Yampolsky and C. F. Price. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 384-386. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Investigates possibilities of using pressure-time measurements of closed-vessel explosions to determine influence of pressure on burning velocity. Graphs, photographs. 9 ref.

3406 Burning-Velocity Measurements in a Spherical Vessel With Central Ignition. John Manton, Guenther Von Elbe, and Bernard Lewis. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 358-363. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes tables. 13 ref.

3407 Factors Affecting Flame Velocity in Stoichiometric Carbon Monoxide Oxygen Mixtures. T. W. Price and J. H. Potter. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 363-369. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes diagrams, photographs, graphs, table. 3 ref.

3408 The Effect of Gaseous Additions on the Burning Velocity of Propane-Air Mixtures. D. B. Leason. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 369-375. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Work was prompted by advantages to be gained by achieving an increase in burning velocity of fuel to be used in an aero-gas turbine. Graphs, diagram, tables. 9 ref.

3409 Decomposition Flame Studies With Ethylene Oxide. Melvin Gerstein, Glen E. McDonald, and Rose L. Schalla. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 375-383; disc., p. 383. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, table. 21 ref.

3410 A Comparison of Schlieren, Shadow and Luminous Methods of Determining Burning Velocities. F. H. Garner,

R. Long, and B. Thorley. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 386-392; disc., p. 392. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes diagrams, graphs. 17 ref.

3411 High-Speed (3000 Frames-Sec.) Photography of Low Pressure, Spark-Ignited Explosions of Methane and of Hydrogen in Oxygen. A. C. Egerton, A. J. Everett, and G. J. Minkoff. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 392-395. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs, table. 5 ref.

3412 Some Observations by Schlieren Technique of the Propagation of Flames in a Closed Vessel. A. C. Egerton, O. A. Saunders, A. H. Lefebvre, and N. P. W. Moore. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 396-402. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Combustion processes in a long, constant volume bomb were studied using simultaneously direct, and schlieren photography. Photographs, diagrams. 7 ref.

3413 Changes in the Shape of Flames Propagating in Tubes. H. Guénoche and M. Jouy. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 403-406; disc., p. 406-407. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper presents experimental results obtained in tubes both with regard to shape of flame front in uniform propagation and to its deformation in nonsteady state. Photographs, table. 9 ref.

3414 The Influence of Inert Gases on Some Flame Phenomena. C. E. Mellish and J. W. Linnett. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 407-420. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Inert gases examined in greatest detail are He, A, and N. Carbon dioxide is also considered to a certain extent. Tables, graphs. 20 ref.

3415 Some Characteristics of Flames Supported by NO and NO_2. W. G. Parker and H. G. Wolfhard. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 420-428. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables. 3 ref.

3416 The Propagation of Cool Flames. J. R. Grove and A. D. Walsh. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 429-439. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Flames were propagated along a tube 65 cm long and 5.0 cm in diameter. Tube was of pyrex, and for all experiments reported here, was supported horizontally. Diethyl ether was used as fuel. Graphs. 19 ref.

3417 Similarity Laws of Deflagration. F. Schultz-Grunow. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 439-443. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes tables, graph. 7 ref.

3418 On the Aerodynamic Field of Stabilized Flames. J. Fabri, R. Siestrunck, and C. Fouré. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 443-450. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs. 7 ref.

3419 On the Structure of Plane Detonation Waves With Finite Reaction Velocity. Stuart R. Brinkley, Jr. and John M. Richardson. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 450-457. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Demonstrates certain general features of plane detonation waves with finite reaction zones that do not depend upon explicit mechanism of detonation reaction. Graph. 7 ref.

3420 Equation of State for Hot Dense Gases and Molecular Theory of Detonation. Taro Kihara and Tsutomu Hikita. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 458-464. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables. 8 ref.

3421 The Possibility of Weak Detonation Waves. A. R. Ubbelohde. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 464-467; disc., p. 467. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Discusses certain less familiar features of "weak" detonations in which the energy liberated may be quite small. At this stage of knowledge discussion is tentative only. Tables, graph. 8 ref.

3422 Contact Transmission of Detonation. S. Paterson. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 468-471. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables. 11 ref.

3423 Gasdynamic Analysis of the Development of Gaseous Detonation and Its Hydraulic Analogy. A. K. Oppenheim. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 471-480. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, diagrams, photographs. 16 ref.

3424 Study of the Mechanism of Transmission of Detonation. L. Deffet, M. De Coster, and P. J. Vande Wouwer. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 481-485. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, diagrams. 7 ref.

3425 Contribution to the Study of Spherical Detonation Waves. N. Manson and F. Ferrié. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 486-494. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs, diagrams. 14 ref.

3426 Detonation and Shock in a Hollow Explosive Cylinder. Morton Sultanoff. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 494-497. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Analysis of detonation and shock associated with a hollow pentolite cylinder 6 inches long, with inside and outside diameter of 1 and 1½ in. respectively. Photographs, diagrams. 7 ref.

3427 Some Properties of Stationary Detonation Waves. R. Siestrunck, J. Fabri, and E. Le Grivés. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 498-501. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes diagrams. 3 ref.

3428 Some Experiments on the Initiation of Detonation in $2H_2O_2$ Mixtures by Uniform Shock Waves. James A. Fay. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 501-507. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, photographs. 12 ref.

3429 Some New Methods of Fast Photography and Their Application to Combustion Processes. J. S. Courtney-Pratt. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 508-526. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Describe two methods developed for study of fast phenomena. Diagrams, photographs. 22 ref.

3430 Cellular Flame Structure and Vibratory Flame Movement in *N*-Butane-Methane Mixtures. G. H. Markstein and L. M. Somers. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 527-535. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

For present work, system *n*-butane-methane was selected be-

Fuels and Combustion

cause among normally gaseous aliphatic hydrocarbons these two fuels differ widely with respect to flame structure while most of their other properties are quite similar. Diagrams, graphs, photographs. 8 ref.

3431 Observations on Disturbed Flames. W. Jost, Joachim Krug, and L. Sieg. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 535-537. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, table.

3432 Flame Instabilities and Combustion Mechanism. H. Behrens. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 538-545. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, diagrams. 13 ref.

3433 The Formation and Some Properties of Polyhedral Burner Flames. J. E. Garside and B. Jackson. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 545-552. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Results confirm that hydrogen is involved in formation of polyhedral flames. Graphs, diagrams, photographs. 19 ref.

3434 Driving Standing Waves by Heat Addition. Perry L. Blackshear, Jr. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 553-566. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Examines experimentally the effect of a flame on a standing-wave system by measuring ability of the flame to damp an imposed standing wave. Graphs, diagrams. 16 ref.

3435 Organ-Pipe Oscillations in a Flame-Filled Tube. Abbott A. Putman and William R. Dennis. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 566-575. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Study has been made of flame-driven oscillations that have frequencies corresponding to organ-pipe frequencies of a combustion tube. Combustion tube used in tests has an axially mounted flame holder, from which a "vee" flame front is held in the premixed gases. This system is similar in configuration to a ram jet. Graphs, tables, diagrams. 10 ref.

3436 An Investigation of Vibrating Flames. W. E. Kaskan. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 575-591. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs, diagrams. 14 ref.

3437 Combustion Inside Refractory Tubes. A. H. Howland and W. A. Simmonds. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 592-601; disc., p. 601-602. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Experiments prove that when a premixed supply of air and gas is burnt inside a refractory tube combustion is of a novel and interesting type since it occurs in a series of explosions. Graphs, diagrams, photographs, tables. 8 ref.

3438 On the Generation of Pressure Waves at a Plane Flame Front. Boa-Teh Chu. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 603-612. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs. 8 ref.

3439 Studies on Turbulent Flames. A. Flame Propagation Across Velocity Gradients. B. Turbulence Measurement in Flames. B. Karlovitz, D. W. Denniston, Jr., D. H. Knapschaefer, and F. E. Wells. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 613-620. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper gives an account of research on turbulent flames now in progress. Photographs, graphs. 2 ref.

3440 The Burning Velocity of Turbulent Flames. Kurt Wohl, L. Shore, H. Von Rosenberg, and C. W. Weil. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 620-635. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Covers theories of turbulent burning velocity and experimental data. Graphs, photographs, diagrams, tables. 11 ref.

3441 The Influence of Isotropic Turbulence on Flame Propagation. H. C. Hottel, G. C. Williams, and R. S. Levine. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 636-644. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes diagrams, graphs, photographs. 8 ref.

3442 Propagation of Turbulent Flames. A. C. Scurlock and J. H. Grover. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 645-658. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper presents a new theory for propagation of turbulent flames differing in several important respects from previous concepts. Graphs, diagrams. 12 ref.

3443 Flame and Schlieren Photographs of Combustion Waves in Tubes. Ernst H. W. Schmidt, H. Steinicke, and U. Neubert. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 658-666. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Experiments on flame propagation in tubes in the former Aircraft Research Institute at Braunschweig-Völkenrode. Photographs, diagrams.

3444 The Effect of Turbulence on Flame Propagation in Gases. Seiichiro Kumagai and Itsuro Kimura. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 667-669. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper describes experiments on effect of turbulence on flame propagation in gases. Photographs, graphs.

3445 A Study of Free Flames in Turbulent Streams. E. S. Starkman, L. P. Haxby, and A. G. Cattaneo. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 670-673. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs. 12 ref.

3446 Some Effects of Turbulence on Combustion. F. W. Bowditch. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 674-681; disc., p. 681-682. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper dscribes effects of controlled amounts of isotropic turbulence upon combustion phenomena as observed in a burner fitted with two pilot flameholders. Diagrams, graphs, photographs, tables. 10 ref.

3447 The Electrical Noise of Turbulent Flames. R. S. Marsden, Jr. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 683-688. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Discusses flame noise; relation between flame noise and turbulence; and interpretation of flame noise. Graphs, diagrams, table. 9 ref.

3448 Sintered Metals as Flame Traps. A. C. Egerton, A. J. Everett, and N. P. W. Moore. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 689-695. 1953. Standing Committee on Combustion. (QD516 Sy68)

Tests were carried out with stoichiometric mixtures of methane or hydrogen with oxygen. Photographs, tables, graphs. 7 ref.

3449 Flame Stabilization on Burners With Short Ports or Noncircular Ports. Joseph Grumer, Margaret E. Harris, and Harold Schultz. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 695-700; disc., p. 701. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Experiments show that in problems of flame stabilization, fuel factors can be dissociated from burner factors. Photographs, graphs. 11 ref.

3450 Physical Characteristics and Stability of Some Low-Temperature Flames: The Hydrogen-Bromine System. Victor D. Phillips, Tom D. Brotherton, and Robbin C. Anderson. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 701-707. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Experimental measurements of physical characteristics and stability of the hydrogen-bromine flames have been made along with studies of burning velocity. Tables, graphs. 10 ref.

3451 On the Extinction Limit of Laminar Flames. Abbott A. Putman and L. Robert Smith. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 708-714. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

In the course of experiments on effect of physical influences on flames, it was discovered that a d.c. field expanded stable range of the burner and consequently increased region over which extinction phenomenon could be observed. Test results obtained for this expanded range are presented and are compared with theoretical predictions based on a proposed mechanism of extinction. Diagram. 9 ref.

3452 Flame Stabilization in Air-Fuel Spray Mixtures. I. Characteristics of a Transverse Rod Stabilizer. H. C. Hottel and Walter G. May. **II. The Effect of Stabilizer Dimensions.** Glenn C. Williams and Frank E. Maddocks, Jr. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 715-733. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables, diagrams. 8 ref.

3453 Some Properties of Rod-Stabilized Flames of Homogeneous Gas Mixtures. Glenn C. Williams and C. W. Shipman. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 733-742. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs, diagrams, tables. 20 ref.

3454 The Influence of Flame Holder Temperature on Flame Stabilization. M. J. Russi, I. Cornet, and R. Cornog. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 743-748. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Investigation was planned to emphasize considerations of fluid mechanics rather than chemical kinetics and reaction mechanisms. Diagrams, graphs. 15 ref.

3455 The Effect of Flameholder Geometry on Combustion Efficiency in Ducted Burners. Emery C. Wilkerson and John B. Fenn. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 749-755; disc., p. 755-756. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper comprises an attempt to explain combustion mechanism in terms of a more or less homogeneous combustion zone without any well defined flame front as such. Diagrams, graphs, tables. 5 ref.

3456 Diffusion Flames. John Barr. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 765-771. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Survey has shown mutual relationship of many of the flames obtainable in a cylindrical burner. Appearance of typical flames and various modes of extinction have been described. Graphs, diagrams, photographs. 13 ref.

3457 Problems of Turbulent Diffusion and Flame Jet. Sakae Yagi and Kenjiro Saji. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 771-781. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs. 17 ref.

3458 Heterogeneous Combustion of Gases in a Vortex System. H. C. Hottel and R. A. Person. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 781-788. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Study observes combustion in a simple type of three-dimensional vortex systems thought to posses significant recirculation for flame stabilization and a regular pattern for achieving mixing. Graphs, diagrams, photographs. 4 ref.

3459 Combustion Length of Enclosed Turbulent Jet Flames. M. W. Thring and M. P. Newby. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 789-796. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper attempts to show how far calculations based on known formulae for free jets or on measurements made with small scale cold mixing models can be used to predict combustion pattern in such flames. Graphs, tables. 10 ref.

3460 Minimum Depth of the Flame Front for Stable Combustion and Maximum Time Mean Energy Release Rates Over an Interval of Combustion Progress for Second-Order Reactions in a Gaseous System at Constant Pressure. W. J. Wohlenberg. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 796-805; disc., p. 805-806. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables, diagrams. 9 ref.

3461 Turbulent Diffusion Flames. Ikutaro Sawai, Masanaga Kunugi, and Hiroshi Jinno. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 806-814; disc., p. 814. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes diagrams, graphs, photographs, tables. 12 ref.

3462 The Relation Between Sampling-Tube Measurements and Concentration Fluctuations in a Turbulent Gas Jet. John M. Richardson, Henry C. Howard, Jr., and Robert W. Smith, Jr. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 814-817. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

3463 Studies of the Combustion of Drops in a Fuel Spray —The Burning of Single Drops of Fuel. G. A. E. Godsave. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 818-829; disc., p. 829-830. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Experimental technique adopted has been to suspend a single drop of fuel on a fine silica filament and to measure with a cinematograph camera rate of decrease in size during combustion in still air. Photographs, graphs, table. 23 ref.

3464 Combustion Studies of Droplet-Vapor Systems. C. A. Gregory, Jr. and H. F. Calcote. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 830-837. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Experimental technique has been developed which allows one to study physical and chemical reactions between a single liquid droplet of one reactant and vapor phase of the other reactant. Diagrams, graphs, tables. 3 ref.

3465 An Experimental Study of the Burning of Single Drops of Fuel in Air at Pressures up to Twenty Atmospheres. A. R. Hall and J. Diederichsen. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 837-846. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Paper is mainly concerned in providing experimental data and to draw attention to some apparent anomalies between results and theoretical expectations. Diagrams, graphs, tables, photographs. 9 ref.

3466 The Combustion of Liquid Fuels. D. B. Spalding. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 847-864. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs, diagrams, tables. 16 ref.

3467 High Frequency Combustion Instability in Rockets With Distributed Combustion. Luigi Crocco and Sin-I. Cheng. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 865-879; disc., p. 879-880. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, tables, diagrams. 7 ref.

Fuels and Combustion

3468 Experimental Investigation of Combustion Instability in Rocket Motors. Herbert Ellis, Irving Odgers, A. J. Stosick, N. Van De Berg, and Robert S. Wick. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 880-885; disc., p. 885. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes photographs, graphs. 6 ref.

3469 The Mixing and Burning of Two Concentric Fluid Streams. Joseph V. Charyk, Irvin Glassman, and Richard R. John. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 886-893. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, diagrams, table.

3470 Pyrotechnic Whistles. W. R. Maxwell. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 906-914. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes graphs, photographs, diagrams, tables. 2 ref.

3471 Augmented Flames in an Engine Combustion Chamber. Kiroku Yamazaki and Kazuo Iinuma. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 914-918. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Work was begun for purpose of ascertaining effect of turbulence induced by a combustion wave propagating through a hydrocarbon-air mixture. Graphs, tables, photographs, diagrams. 10 ref.

See also:

2985 (semicoking of low grade coal)
2999 (physics of coal)
3025 (polarographic analysis of gasoline)
3055 (reagents for detecting gaseous atoms and free radicals in combustion systems)
3532 (use of alcohol in diesel fuel)
3689 (combustion of gas in Cu smelters)
3891 (design of soaking pit furnaces)

GEOLOGY AND MINERALOGY

3472 Preparation of Rock Thin Sections. Frank S. Reed and John L. Mergner. *American Mineralogist*, v. 38, Nov.-Dec. 1953, p. 1184-1203.

Includes photographs. 14 ref.

3473 On Some Physical Aspects of the Theory of the Origin of Mountain Belts and Island Arcs. Adrian E. Scheidegger. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1148-1155.

Physical explanation can be given within framework of contraction hypothesis of orogenesis for four types of junction of island arcs and mountain belts observed by geologists. Diagrams. 7 ref.

3474* Evaluation of Pegmatitic Mineral Deposits. Robert B. Rowe. *Canadian Mining and Metallurgical Bulletin*, v. 46, no. 499, Nov. 1953, p. 700-705.

Presents a brief description of internal structure. Discusses preparation of pegmatitic mineral deposits for examination. Describes mapping, sampling, grade, treatment of fine-grained minerals, and general procedures for evaluation. Diagrams, table. 25 ref.

3475* Study of the Decomposition Products of Alumina Hydrates by Differential Thermal Analysis and by Microscope. Jacques Charrier and Denis Papée. *Comptes rendus*, v. 237, no. 16, Oct. 19, 1953, p. 897-900.

Reports on experiments done with specimens of hydrargillite and bayerite prepared at various conditions of temperatures and pressures. Results are indicated and interpreted.

3476* Properties of Al_2TiO_5. (Russian.) V. A. Bron and A. K. Podnogin. *Doklady Akademii Nauk SSSR*, v. 91, no. 1, July 1953, p. 93-94.

Petrographical and X-ray studies were made. Results showed a very small heat expansion rate indicating high heat resistance. Tables. 4 ref.

3477* Problem of the Choice of Size Fractions for Mineralogical Analysis. (Russian.) U. G. Distanov. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 637-639.

Paleographic and correlated constructions according to terrigenous components can be correctly effected only on the basis of a qualitative and quantitative structure. Graphs. 12 ref.

3478* New Data on the Slag Pyroxene Series of $FeSiO_3$-$MgSiO_3$. (Russian.) *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 153-155.

Results of chemical analysis and X-ray studies are presented. Tables. 2 ref.

3479* Pleistocene and Recent Sediment From the Floor of the Northeastern Pacific Ocean. Henry W. Menard. *Geological Society of America, Bulletin*, v. 64, Nov. 1953, p. 1279-1293.

Seven dredge hauls on seamounts and nine cores of the sea floor, show that glacial marine drift was deposited over several hundred thousand square miles of the Northeastern Pacific during Pleistocene time. Some ice-rafted pebbles are covered by as much as 50 mm of Mn dioxide, suggesting a minimum age of 50,000 years. Diagrams, photographs, tables. 35 ref.

3480* The Forces of Polarizability in the Crystals. (French.) A. Herpin. *Journal de physique et le radium*, v. 14, no. 11, Nov. 1953, p. 611-620.

Investigates effect of ion polarizability on evaluation of interionic forces in an ionic crystal. 17 ref.

3481 Velma Oil Field Stephens County, Oklahoma. Richard B. Rutledge. *Petroleum Engineer*, v. 25, Dec. 1953, p. B38, B40-B42, B44, B47-B48.

Geological history and production characteristics of complex Anadarko Basin structure are reviewed. Graphs, diagrams, tables.

3482 Petroleum Geology of Oklahoma. Clark Millison. *Petroleum Engineer*, v. 25, Dec. 1953, p. B93-B94, B96, B98, B101, B103.

Discusses structures and numerous producing zones. Graphs, diagrams.

3483 The Iron Sea. John Pfeiffer. *Steelways*, v. 9, Dec. 1953, p. 1-5.

Presents theory of formation of Fe deposits in northern Minnesota and Michigan. Photographs.

3484* Surface Minerals Reveal Michigan Structures. Bernard H. Lasky. *World Oil*, v. 137, Dec. 1953, p. 100, 102-104, 106.

Mineral alternation studies detect subsurface structures covered by thick glacial drift and therefore unresponsive to geophysical surveys. Diagrams. 4 ref.

Books and Miscellaneous Publications

3485 Diamond Technology. Paul Grodzinski. 2nd Rev. Ed. 784 p. 1953. N.A.G. Press Ltd., London. (TS753 G89d2)

Covers general and special manufacturing methods for diamonds and gem stones.

GEOPHYSICS

3486* Auroras—What They Mean to Us. O. B. Jacobs. *Bell Laboratories Record*, v. 31, Oct. 1953, p. 380-384.

Discusses disturbances in electrical communication which occur at the same time as the Aurora. Photograph, diagram, graph.

3487* The Altitudes of the Luminous Layers in the Earth's Atmosphere. D. R. Bates and A. Dalgarno. *Journal of Atmospheric and Terrestrial Physics*, v. 4, Oct. 1953, p. 112-123.

Consideration is given to various excitation mechanisms theoretically responsible for airglow phenomena. Tables. 51 ref.

3488* The Reception of Atmospherics at High Frequencies. F. Horner. *Journal of Atmospheric and Terrestrial Physics*, v. 4, Oct. 1953, p. 129-140 + 3 plates.

Presents technique which forms basis for routine estimation of distances of storms. Diagram, maps, graph, table, photograph.

3489 Magnetic Properties of the Earth's Interior. A. T. Price. *Nature*, v. 172, Oct. 31, 1953, p. 786-787.

Theories are presented to explain aspects of geomagnetic dipole field.

3490* Advances in Radio-Astronomy. (Russian.) I. S. Shklovskii. *Nauka i Zhizn*, v. 20, no. 9, Sept. 1953, p. 14-16.

Describes equipment and importance of this science. Relationship is claimed between cosmic rays and radio-astronomy. Photographs.

3491* Upper Atmosphere Research. *Research Reviews, Office of Naval Research*, Oct. 1953, p. 1-6.

Describes experiments using instrumented rockets launched from balloons at altitudes of 70,000 ft. Photographs.

3492* Rapid Periodic Fluctuations of the Geomagnetic Field. I. E. R. R. Holmberg. *Royal Astronomical Society, Monthly Notices, Geophysical Supplement*, v. 6, Oct. 1953, p. 467-481.

Includes graphs, diagrams, and tables. 13 ref.

See also:
3332 (food resources of the sea)

GRAPHIC ARTS

3493* Paper as a Medium of Printing. William Bond Wheelwright. *American Pressman*, v. 64, Dec. 1953, p. 24-28. Historical review. 5 ref.

3494 On the Shrinkage Factor of Nuclear Emulsions. L. H. Greenberg and R. N. H. Haslam. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1115-1120.

Simple and accurate method to determine shrinkage factor of nuclear emulsions is presented. Graphs, diagram. 9 ref.

3495* How to Achieve 3-Color Effect With Single Printing. *Canadian Printer and Publisher*, v. 62, Dec. 1953, p. 37, 54 .

Simple die cutting and folding is used with two-tone paper stock for low cost direct mail printing. Diagrams.

3496* Planning the Printing Plant for Maximum Production. I. Milford M. Hamlin. *Graphic Arts Monthly*, v. 25, Dec. 1953, p. 8, 10, 12, 14.

Planning printing plants properly for maximum production includes equipment that will be most productive for class of work to be handled and arrangement of this equipment on the floor to eliminate lost motion, both in its individual operation and throughout the plant as a whole. (To be continued.)

3497* Lithographic Chemicals—Mixing and Control. David M. Smith. *Graphic Arts Monthly*, v. 25, Dec. 1953, p. 66, 68, 70, 73, 108, 110, 112.

3498* Prescreened Negatives. A Unique Film for Simplifying Halftone Negative Making. R. E. Maurer and J. A. C. Yule. *Graphic Arts Monthly*, v. 25, Dec. 1953, p. 74, 76, 78, 80, 82, 84, 112, 114, 116.

Includes graphs, photographs.

3499* Tin Printing on the Grand Scale. *Industrial Finishing (London)*, v. 6, Nov. 1953, p. 254-258.

Describes facilities of tin-printing plant. Photographs.

3500 The Effect of Impurities on the Optical Sensitization of the Photographic Emulsion. W. West and B. H. Carroll. *Journal of Physical Chemistry*, v. 57, Nov. 1953, p. 797-801; disc., p. 801.

Details and examples are given of the phenomena of super- and anti-sensitization. 20 ref.

3501* How to Analyze Your Costs. Frank R. Turner, Jr. *Modern Lithography*, v. 21, Dec. 1953, p. 34-38.

Presents a system of cost accounting in a lithographic plant. Charts.

3502* Varnishing by Roll Coating. Materials Used in Paper Coatings. H. Audino. *Modern Lithography*, v. 21, Dec. 1953, p. 39-42.

Discusses use of organic solvents, film forming resins, synthetics, rubber, nonflexible resins, plasticizers, and modifiers. (To be continued.)

3503* Elements of Color Process Reproduction. VI. Continuous Tone Retouching for Separation Negatives. Andy Perni. *Modern Lithography*, v. 21, Dec. 1953, p. 44-45.

Discusses common faults in transparencies. Presents general technique in color correction retouching.

3504* A Unique Film for Halftone Negative With Halftone Screen Built In. R. E. Mauer and J. A. C. Yule. *Modern Lithography*, v. 21, Dec. 1953, p. 53-56.

Describes equipment and techniques employed in process. Diagrams, graph.

3505* Control Instruments for Offset Lithography. Henry R. Long. *National Lithographer*, v. 60, Nov. 1953, p. 26-30.

Includes photographs and discussion on types of control instruments.

3506* A New Era for Halftones. Frank Preucil. *National Lithographer*, v. 60, Nov. 1953, p. 38-39.

Kodalith Autoscreen Film provides a simpler way of making halftone negatives.

3507* Kodak Photo Resist. *National Lithographer*, v. 60, Nov. 1953, p. 42-44.

New dual-purpose coating material that is not affected by humidity. Diagrams.

3508* Rubber Covered Rolls on Paper Machines. Ralph M. Leighton. *Paper Trade Journal*, v. 137, Dec. 4, 1953, p. 18-21, 23-24, 26.

Discusses manufacture, maintenance and storage, and uses other than in the paper industries. Photographs, diagrams.

3509* Overlay Masks Made Automatically by New Method. Walter S. Marx, Jr. *Photoengravers Bulletin*, v. 43, Nov. 1953, p. 79-87.

Presents details of process.

3510* New Engraving Horizons—With Fotosetter. Harold B. Plaut. *Photoengravers Bulletin*, v. 43, Nov. 1953, p. 93-99.

Describes photographic typesetting machine.

3511* Current Developments in Lighting for Color Control. W. B. Reese. *Photoengravers Bulletin*, v. 43, Nov. 1953, p. 113-117.

Discusses importance of type of lighting used when making color evaluations. Photograph.

3512* The Improved Time Scanner—A Progress Report. Roswell E. Fisher. *Photoengravers Bulletin*, v. 43, Nov. 1953, p. 217-225.

Describes design and operation of an electronic color scanner.

3513* Photographic Monobaths for Rapid Processing. Harry S. Keelan. *Photographic Engineering*, v. 4, 1953, p. 157-161.

Four monobaths have been evolved as a means of minimizing time, space, and equipment required for processing of aerial film and printing paper. Graphs, tables. 5 ref.

3514* New Priming Technique. John Starr. *Product Finishing*, v. 18, Dec. 1953, p. 62-64.

Technique involves preliminary use of a thermosetting wash primer, over which a vinyl Zn chromate seal primer or cover coat can be applied. Photographs.

3515* The Photographic Process. Fundamental Aspects of Sensitivity. W. F. Berg. *Times Science Review*, 1953, Winter, p. 3, 5-6.

A general review. Photographs, micrographs.

Graphic Arts

3516 The Electrical Approach to Particle Flocculation in Concentrated Non-Aqueous Dispersions. Andries Voet. *American Ink Maker,* v. 31, Dec. 1953, p. 34-37, 39, 67.

Discusses electrical methods for evaluation of particle flocculation in printing inks. Graphs, table. 13 ref.

3517 How Inks Dry. III. Frederick A. Varron. *American Ink Maker,* v. 31, Dec. 1953, p. 43-45, 67.

Discusses drying by filtration, gelatin, polymerization by oxidation, and thermal polymerization. 16 ref.

See also:
2803 (photography in aero dynamics)
2930 (printing on glass)
4137 (photosensitive plastics)

HEAT POWER

3518* Automatic Control of Gas Turbines for Natural Gas Pipeline Pumping. C. R. Ingemanson, Arne Loft, and H. J. Wilt. *Application and Industry,* 1953, no. 9, p. 295-300.

Describes control equipment and its operation. Diagrams.

3519 Design Features of G-E J47 Turbojet. R. E. Small. *Aviation Age,* v. 20, Dec. 1953, p. 56-67.

Includes photographs, diagrams.

3520 Supervisory Instruments for Steam Turbine. J. E. Spahr. *Blast Furnace and Steel Plant,* v. 41, Dec. 1953, p. 1458-1461.

Discusses instruments available. Predicts future development. Diagrams. (To be continued.)

3521* Containing Crankcase Explosions. R. O. Montenero. *Diesel Power,* v. 31, Nov. 1953, p. 54-56, 79.

Briefly reviews theoretical aspects of an explosion, a description of engine design modifications, experimental tests, and field experience with redesigned engine. Photographs, diagrams.

3522* Hamilton Engine. Freeport's Latest. *Diesel Power,* v. 31, Dec. 1953, p. 36-41.

Describes diesel engine and fuel system accommodating both light oil and Bunker "C" fuel. Photographs, diagram.

3523* Get the Most From Your Air Cleaner. H. M. Turner. *Diesel Power,* v. 31, Dec. 1953, p. 58-61.

Discusses factors affecting efficiency of air cleaners for diesel engines. Graphs, photographs, tables.

3524* Cooling System Corrosion Problems. R. S. Wise. *Diesel Power,* v. 31, Dec. 1953, p. 64-66.

Discusses use of corrosion inhibitors in water-cooled diesel engines. Photographs, diagram.

3525* Diesel Traction in 1953. *Diesel Railway Traction,* v. 7, Dec. 1953, p. 263-310.

Review of diesel locomotives in Great Britain, Europe, Australasia, Asia, Africa, and North and South America. Includes data on engines and transmissions. Photographs.

3526* Main Propulsion Gas Turbine Set for the Oil Tanker "Auris". B. E. G. Forsling. *Engineer,* v. 196, Dec. 4, 1953, p. 733-735.

Describes gas turbine set which replaces one of four original diesel engines. Graphs, tables, diagrams.

3527* Rolls-Royce Turbine for Marine Propulsion. *Engineering,* v. 176, Nov. 27, 1953, p. 673-676 + 1 plate.

Describes construction and operation. Photographs, graphs, diagrams.

3528 Automatic Extraction Steam Turbines in Czechoslovakia. J. Nevole, F. Michele, and J. Mayer. *Engineers' Digest,* v. 14, Nov. 1953, p. 427-430. (Translated from *Strojirenstvi,* v. 2, no. 10, 1952, p. 454-465.)

Includes diagrams.

3529* Torsional Vibrations in Diesel Engines. Christian G. Goohs. *General Motors Engineering Journal,* v. 1, Nov.-Dec. 1953, p. 8-14.

Discusses elimination of above by application of theory. Presents equations which can predict these disturbances at critical speeds. Diagrams, tables, graphs. 7 ref.

3530* A Study in Applied Physics: Locating the Piston Pin to Minimize Piston Slap. Gilbert Burrell and F. Gibson Butler. *General Motors Engineering Journal,* v. 1, Nov.-Dec. 1953, p. 38-43.

Includes diagrams, graphs, table. 11 ref.

3531 Balancing Steam Demands for Heating, Process and Power With Steam Turbines. Maynard D. Church. *Heating and Ventilating,* v. 50, Nov. 1953, p. 91-98.

Includes diagrams, tables, photographs.

3532* The Utilization of Power Alcohol in Combination With Normal and Heavy Fuels in High Speed Diesel Engines. H. A. Havemann, M. R. K. Rao, A. Natarajan, and T. L. Narasimhan. *Indian Institute of Science, Journal,* v. 35, Sec. B, Oct. 1953, p. 215-247.

Discusses incorporation and use of alcohol in diesel fuel by blending or by carburetion. Graphs, tables, diagrams, photographs. 12 ref.

3533 New Water Tube Package Boiler Beats Predicted Performance. Viggo Marcussen. *Industry and Power,* v. 65, Dec. 1953, p. 86.

Includes photograph.

3534 The Place of the Gas Turbine in Industry. T. J. Putz. *Iron and Steel Engineer,* v. 30, Dec. 1953, p. 62-66; disc., p. 66-68.

When problems of burning blast furnace gas have been solved, the gas turbine unit should find a place in the steel plant. Photographs, diagrams, tables, graph.

3535* Heat Exchange in Cooled Combustion Chambers During Gas Combustion. (Russian.) S. N. Shorin and K. N. Pravoverov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1953, no. 8, Aug., p. 1122-1129.

Experimental investigations revealed a strong influence of character and location of radiation foci on heat exchange. Table, graphs, diagrams.

3536* How Buick Builds Sapphire Jet Engines. Charles H. Wick. *Machinery,* v. 60, Dec. 1953, p. 155-162.

The Wright J-65 Sapphire is rated as one of the most powerful and efficient jet engines now being manufatcured, having 7200 pounds of thrust and developing 13,000 hp. at high speed. Photographs.

3537* Rolls-Royce Marine Gas Turbine. *Overseas Engineer,* v. 27, Dec. 1953, p. 169-170, 172.

Describes construction and performance. Photographs, diagrams.

3538 The Measurement of Engine Wear by the Use of Radio-Isotopes. *Petroleum,* v. 16, no. 12, Dec. 1953, p. 358-361.

Discusses precautionary measures and test equipment and procedures. Graph, photographs.

3539 How to Cure Acid Indigestion in Engines. W. G. Nostrand. *Petroleum Engineer,* v. 25, Dec. 1953, p. D12, D14, D16, D18.

Use of low grade fuels has caused internal ailments in engines, with resultant higher maintenance costs. Diagrams, photographs, table.

3540* A New Marine Gas Turbine. Demonstration of Rolls-Royce RM60. *Petroleum Times,* v. 62, Nov. 27, 1953, p. 1187-1189.

Includes diagram, photograph.

3541* Method of Statistical Electronic Measurements of Combustion Phenomena in Reciprocating Engines. (French.) R. Vichnievsky and J. Weissmann. *Revue de l'institut francais*

du petrole et Annales des combustibles liquides, v. 8, no. 8, Aug. 1953, p. 423-435.

Discusses abnormal combustion measurements showing amplitude and frequency of vibrations. Photographs, diagrams, graphs. 36 ref.

3542* The Elimination of Lead Deposits in Engine Cylinders by Means of Organo-Brominated Vapors. (French.) Maurice Letort and André Combe. *Revue de l'institut francais du petrole et Annales des combustibles liquides*, v. 8, no. 10, Oct. 1953, p. 491-503.

New experiments show that scavenger reactions occur simultaneously on PbO deposited on wall of reaction tube as well as in gas phase on gaseous molecules, fine suspensions, or dusts. Graphs.

3543* Photochemical Processes in AgCl-Ag_2S Solid Solutions. (German.) E. Schöne. *Zeitschrift für Physik*, v. 136, no. 1, 1953, p. 52-56.

Measurements were made by using 406 mμ line of Hg-discharge tube at —186 C. Details of experimental arrangements are presented. Graphs. 3 ref.

Books and Miscellaneous Publications

3544 Fourth International Symposium on Combustion. Committee on Combustion Symposia. 926 p. 1953. Williams & Wilkins, Baltimore. (QD516 Sy68)

Includes survey papers and papers on flammability; ignition; theoretical and experimental studies on laminar combustion and detonation waves; cellular flames and oscillatory combustion; turbulent flames; quenching, flash back, and blow off; stabilization by flame holders; flames of fuel jets; burning of fuel droplets; and combustion in rockets and engines, all of which are individually abstracted.

3545 The Engineering Application of Combustion Research to Ramjet Engines. J. Friedman, W. J. Bennet, and E. B. Zwick. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 756-764; disc., p. 764. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Four items have been chosen to indicate type of analytical tools now being used to correlate research and design data. These are combustion stability, which is concerned with requirement of flame holding; fuel distribution in the engine; combustion efficiencies, which are concerned with mechanism of heat release; and pressure loss, associated with flame holding devices. Graphs, diagrams, table. 19 ref.

3546 Combustion Instability in Solid-Propellant Rockets. R. P. Smith and D. F. Sprenger. Paper from FOURTH INTERNATIONAL SYMPOSIUM ON COMBUSTION. p. 893-906. 1953. Standing Committee on Combustion Symposia. (QD516 Sy68)

Includes tables, graphs, photographs, diagrams. 9 ref.

See also:
2797 (aircraft propulsion)
2914 (ceramics in engines)
3960 (ceramic coating in engines)

INFORMATION—PREPARATION AND DISSEMINATION

Books and Miscellaneous Publications

3547 Studies in Coordinate Indexing. Mortimer Taube, et al. 110 p. 1953. Documentation, Inc. (Z1001 T18s)

Covers theory and practice of documentation; functional approach to bibliographic organization; specificity in subject headings and coordinate indexing; unit terms in coordinate indexing; choice of terms for a uniterm coordinate index; alphabetic subject indexes and uniterm coordinate indexes; classification and categorization in information systems; logical structure of coordinate indexing; substitutes for the card catalog; and evaluation of information systems for report utilization.

See also:
3252 (information theory)
3264 (literature selection equipment)

INSTRUMENTATION AND LABORATORY APPARATUS

3548* Color Control in the Bell System. W. J. Kiernan. *Bell Laboratories Record*, v. 31, Oct. 1953, p. 375-379.

Discusses design and use of instrument for color control which measures hue, value, and chroma of color. Photographs, graph.

3549* New Method of Measuring Magnetic Susceptibilities. (French.) Adolphe Pecault, Bernard Lemanceau, and Jacques Joussot-Dubien. *Comptes rendus*, v. 237, no. 19, Nov. 9, 1953, p. 1156-1158.

Briefly describes apparatus for measuring susceptibilities of diamagnetic substances based on variation of magnetic flux on the inside of a solenoid when substance to be studied is inserted. Table, diagram.

3550* Study of the Deformed State With the Help of Radioactive Isotopes. (Russian.) S. I. Gubkin and S. A. Dovnar. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1089-1090.

Radiographs permit examination of degree of change at each point and main direction of deformation at its terminal moment. Method was shown to be particularly valuable for terminal plastic processes. Micrograph.

3551 Direct-Indicating Recording Instruments. II. S. R. Gilford. *Electrical Manufacturing*, v. 52, Dec. 1953, p. 120-128.

Basic operating principles, design elements, and frequency response of various commercial instruments are analyzed; including null-type, moving-coil, and photo-electric types with associated pen motors. Graphs, photographs, diagrams, table. 14 ref.

3552* Microwave System Blankets Extensive Power Network. H. W. Berning. *Electric Light and Power*, v. 31, Dec. 1953, p. 81-86.

Central Illinois Public Service Company's microwave communication and telemetering facilities comprise an integral section of the combined microwave system of the Northern Sponsors of Electric Energy, Inc., operators of one of the nation's largest microwave installations for power company use. Photographs, table, diagram.

3553* Leased Channels for Metering and Control. H. H. Joyner. *Electric Light and Power*, v. 31, Dec. 1953, p. 100-106.

Characteristics of telephone company facilities make them especially adaptable for transmission of telemetering and control signals. Maximum reliability is a paramount feature. Diagrams, photographs, graphs, tables.

3554 A Remote Control and Telemetering System for a Van De Graaff Generator. II. B. Millar. *Electronic Engineering*, v. 25, Dec. 1953, p. 506-508.

Includes diagrams. 3 ref.

3555* Liquid-Metal Sampling Apparatus. *Engineering*, v. 176, Dec. 4, 1953, p. 735.

Describes apparatus which enables furnace samples of steel or other metals to be produced in finely granulated or divided form directly from liquid state. Diagram.

3556 New Tools for Research. Help From the Atomic Pile. T. H. Messenger. *India-Rubber Journal*, v. 125, Dec. 5, 1953, p. 41-44, 46, 48, 54.

Describes bombardment of polymers with nuclear particles, use of radio-active isotopes, applications of infra-red spectroscopy, and ultrasonics.

3557 TV for Industry. Norman J. Rivkees and Richard T. Kohler. *Industry and Power*, v. 65, Dec. 1953, p. 60-63.

Overlooking a freight yard or inside a steel furnace, a TV camera can give the operator a "bird's eye" view of what's going on in the plant. Photographs.

3558 The Graphic Panel. S. D. Ross. *Industry and Power*, v. 65, Dec. 1953, p. 76-78.

Plant facilities are becoming more complex with resulting concentrations of instrumentation in centralized control areas. Graphic panel is helping reduce resulting complexities by coordinating diverse control functions. Diagrams, photograph.

Instrumentation and Laboratory Apparatus

3559* Cooling Water Commander. P. W. McRaven. *Instrumentation*, v. 7, no. 1, 1953, p. 10-13.

Describes control panel for continuously indicating oxidation inhibitor concentration, dissolved solids concentration, and pH of recirculated cooling water. Photographs, diagram.

3560 Nuclear Reactors for Industry and Research. IV. Radiation Protection. Karl Z. Morgan. *Instruments*, v. 26, Dec. 1953, p. 1872-1874, 1900-1903.

Includes tables, photographs.

3561 Calculations for Natural Gas Orifice-Meter Coefficients. H. R. Garabrant. *Instruments*, v. 26, Dec. 1953, p. 1897-1898.

Use of handbook tabular data makes possible rapid calculation of orifice-meter coefficients. Two examples, one for regular charts and one for square-root charts, illustrate steps necessary. Tables.

3562 A Steel-Plate Thickness Meter. S. S. Carlisle and R. B. Sims. *Instruments*, v. 26, Dec. 1953, p. 1880-1881, 1903-1904.

Instrument for measurement of thickness of steel plates when only one face is accessible uses total magnetic induction in body of plate at saturation. Development, construction, and performance are presented. Graphs, diagrams, photographs. 9 ref.

3563 Bore Profilometer. S. S. Carlisle and R. B. Sims. *Instruments*, v. 26, Dec. 1953, p. 1882-1883, 1906.

A profilometer for accurate measurements of internal profile of small bores, as in wire-drawing dies, uses probe and optical-reflection technique. Development, features, and performances are presented. Diagrams, photographs. 4 ref.

3564* Magnetic Spectrometer With Electronic Radiation. (French.) Mitsuo Sakai. *Journal de physique et le radium*, v. 14, no. 11, Nov. 1953, p. 570-583.

Proposes general method for comparison of spectrometers with magnetic lenses, semi-circular focalization, and spiral orbits. Further possibilities for applying method proposed are indicated. Graphs, tables. 20 ref.

3565 A Rotating Anode Gas X-Ray Tube. E. A. Owen. *Journal of Scientific Instruments*, v. 30, Nov. 1953, p. 393-395.

By using fine focus made possible by rotating the anode, more intense X-ray beams are made available. Diagram.

3566* How Form Tolerances Affect Gaging Requirements. III. Earle Buckingham. *Machinery*, v. 60, Dec. 1953, p. 180-185.

Author shows how tolerances on form—particularly tapers—are selected and how they determine gaging requirements. Graphs, diagrams.

3567 Materials For O-Ring Seals. Their Properties and Selection. E. L. Carlotta. *Materials & Methods*, v. 38, Dec. 1953, p. 104-107.

Reports natural and synthetic rubbers; silicone elastomers; and certain plastics meet exacting requirements demanded in liquid and gas-tight seals. Photographs, diagrams, table.

3568 Progress Report on the NBS Permeameter. G. P. McKnight. *Metal Powder Association, Proceedings*, 1953, p. 6-12; disc., p. 12-13. (TN695 M56p)

Describes principle of operation and several adaptations that have been made to make the instrument suitable for measuring Fe core properties at high frequencies and to simplify calculation of results. Photographs, diagrams, graphs. 5 ref.

3569* The Problem of Defining Micro-Geometrical Irregularities of Mechanical Parts. P. Nicolau. *Microtecnic (English Ed.)*, v. 7, no. 5, 1953, p. 220-225.

Translated from the French. Presents an attempt to standardize terms used in surface roughness measurement. Graphs, diagrams.

3570* Telemetering Systems. Walter Bösch and E. P. F. Zurich. *Microtecnic (English Ed.)*, v. 7, no. 5, 1953, p. 256-260.

Discusses impulse-frequency, variable-frequency, and frequency-balance systems for indication of instantaneous and recording of average measured values. Diagrams.

3571 Automatic Grain Counter for Assessing Quantitatively High-Resolution Autoradiographs. R. A. Dudley and S. R. Pelc. *Nature*, v. 172, Nov. 28, 1953, p. 992-993.

Describes construction and operation. Graph.

3572 Theory of the Manometer Accelerometer. Douglas Steen and Donald Casey. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1021-1028.

Investigates possible use of U- and O-tube manometers as extremely accurate and sensitive accelerometers. Diagrams.

3573 A Microbalance for the Determination of Protein Crystal Densities. F. M. Richards. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1029-1034.

Microbalance has been developed for simultaneous measurement of apparent weight and volume of a single protein crystal immersed in its mother liquor. Diagram, photographs.

3574 A Method of Describing the Detectivity of Photoconductive Cells. R. Clark Jones. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1035-1040.

A simple method is proposed for the above. Diagrams, tables.

3575 Apparatus for the Measurement of the Thermal Conductivity of Solids. James L. Weeks and Ralph L. Seifert. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1054-1057.

Describes apparatus which does not require attaching of thermocouples to sample and permits introduction and removal of sample by remote control. Diagrams, table.

3576 A Twin Photocell Circuit Suitable for the Control of Thermostats and Furnaces. G. W. Benson and G. C. Benson. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1070-1071.

Includes diagram. 8 ref.

3577* Observations on Some Commercial Colour-Matching Lamps. J. C. Guthrie and P. H. Oliver. *Society of Dyers and Colourists, Journal*, v. 69, Nov. 1953, p. 430-435.

Compares commercial lamps of fluorescent tube type. Tables, graphs. 26 ref.

3578 FM/FM Telemetering. I. W. J. Mayo-Wells. *Tele-Tech*, v. 12, Dec. 1953, p. 90-93, 174-176.

Describes basic principles of a system developed specifically for rockets and other airborne machines. Diagram, photographs.

See also:
3307 (flow tubes)
3568 (the NBS permeameter)
4138 (optical method for observing stress strain in transparent solids)

LUBRICATION AND FRICTION

3579 Plain Bearings. Some Aspects of the Design of Bearings for Automobile Engines. *Automobile Engineer*, v. 43, Nov. 1953, p. 463-473.

Discusses advantages and shortcomings of various alloys. Outlines ways to select best material. Graphs, micrographs.

3580 Lubrication Trends. II. W. A. Zisman. *Canadian Chemical Processing*, v. 37, Nov. 1953, p. 68, 70, 72.

Discusses friction and wear research; polar-type liquids; adsorption effects; sulfur and chlorine compounds; ester lubricants; polyalkylene oxides; and detergent additives.

3581* Synthetic Lubricating Oils. (Spanish.) Juan Rodriguez Jurado. *Combustibles*, v. 13, no. 67, May-June, 1953, p. 167-175. + 1 plate.

Experiments were conducted with synthetic lubricants using petroleum paraffin as raw material fractionated with methyl-ethyl-ketone. Tables, graphs. 16 ref.

3582* Viscous Properties of Plastic Lubricants and Resistance to Rotaiton of Roller Bearings. (Russian.) G. V.

Vinogradov and M. D. Bezborod'ko. *Doklady Akademii Nauk SSSR*, v. 90, no. 6, June 21, 1953, p. 1019-1022.

Experiments confirmed all principal deductions. Table. 4 ref.

3583* Elastic-Strength Properties and the Starting Characteristics of Plastic Lubricants. (Russian.) G. V. Vinogradov and M. M. Gvozdev. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1151-1154.

Investigations were carried out on standard precision ball bearings 201, 204, 207, 210, and 212. Graphs, table. 3 ref.

3584* Temperature and Displacement of Cylindrical Sleeve Bearings at High Speeds. (German.) Hermann Stephan. *Forschung auf dem Gebiete des Ingenieurwesens*, v. 19, Ausgabe B, *VDI-Forschungsheft* 439, 1953, 36 p.

Equations are presented for mean bearing temperature, friction coefficient of power loss, and feed rate of oil in an antifriction bearing. Graphs, diagrams. 37 ref.

3585* The Electron Microscope in the Petroleum Industry. *Lubrication*, v. 39, Dec. 1953, p. 141-152.

Presents general discussion of principles, design, and applications of the electron microscope. Dscribes its use in investigations of lubricants and fuels. Diagrams, photographs.

3586* Air Bearings—Low Friction. D. D. Fuller. *Lubrication Engineering*, v. 9, Dec. 1953, p. 298-301.

Discusses underlying principles of design, construction, and application of air lubricated bearings. Diagrams, photograph. 8 ref.

3587* Mechanisms of Sleeve Bearing Failure. P. B. Burgess. *Lubrication Engineering*, v. 9, Dec. 1953, p. 309-312.

Presents an examination scheme for finding most probable failure mechanisms of damaged bearings. Discusses use of wide angled magnifier and magnetized pick or probe. Photographs.

3588 How to Prevent Oil Film Whirl in Journal Bearings. R. S. Sherwood. *Machine Design*, v. 25, Dec. 1953, p. 163-168.

Discusses causes of journal instability and practical remedies. Graphs, diagrams. 15 ref.

3589 Many Tests Show Qualities of Engine Lubricating Oils. I. W. A. Gruse. *Petroleum Engineer*, v. 25, Dec. 1953, p. C23-C24, C26-C28.

Some properties can be determined comparatively by empirical tests; others require actual engine operating tests. Photographs, graph, table. (To be continued.)

3590 A Quantitative Study of the Wear Process. E. Rabinowicz. *Physical Society, Proceedings*, v. 66, no. 407 B, Nov. 1953, p. 929-936.

Describes determination of the mass of wear fragments using autoradiographic techniques. Graphs, diagrams. 7 ref.

3591 How to Lubricate Your Chain Drive. A. F. Brewer. *Power Engineering*, v. 57, Dec. 1953, p. 68-69, 126, 128.

Includes photographs, diagrams.

3592* Laboratory Evaluation of Lubricating Greases. I. Viscosity, Flow, Penetrometer, and Plunger Rheometers. E. G. Ellis, *Scientific Lubrication*, v. 5, Feb. 1953, p. 11-16.

Includes graphs, diagrams, photographs. (To be continued.)

3593* The Lubrication of Ball and Roller Bearings. III. Greasing: Methods of Application, During Initial Assembly and When Replenishing. *Scientific Lubrication*, v. 5, Feb. 1953, p. 17-19.

Includes diagrams, photographs.

3594* Technical Curiosities. II. Molecular Glands. Maxwell Smith. *Shell Aviation News*, 1953, no. 184, Oct., p. 14-16.

Second of a series of articles dealing with curious phenomena and points of topical interest associated with use in aircraft of oils, greases, and special petroleum products. Graphs, diagrams, tables.

3595 Centralized Lubrication Elixir for Machine Life. Robert F. Huber. *Steel*, v. 133, Dec. 7, 1953, p. 136-138.

Discusses advantages of centralized lubrication of machine components. Photographs.

See also:

3025 (polarographic analysis of lubricants)
3538 (wear testing)
3647 (Cu-Ag-Pb bearing alloy)
3750 (lubrication of tools in pressure casting)
3907 (lubrication during maching of stainless steel)
3976 (testing bearing surfaces)

MECHANICAL ENGINEERING

3596 Automation of Assembly. "In-Line" Assembly Machine Speeds Small-Parts Manufacture. Loris H. Conrad and Hilton J. McKee. *American Machinist*, v. 97, Dec. 7, 1953, p. 121-124.

Describes equipment, plant layout, and operating procedures. Photographs, diagrams.

3597 How Automatic Engine Factory Works. Irving Stone. *Aviation Week*, v. 59, Dec. 14, 1953, p. 48-49, 51, 54.

Describes assembly line for turbo compound aircraft engines. Photographs.

3598 Automatic Controls. I. *Canadian Chemical Processing*, v. 37, Nov. 1953, p. 44, 46, 48, 50, 52.

General discussion of types of controls and how they operate.

3599* Non-Synchronous Excitation. (French.) Nicolas Minorsky. *Comptes rendus*, v. 237, no. 17, Oct. 28, 1953, p. 964-966.

Studies appearance of an oscillation under influence of an external periodic oscillation with arbitrary frequency.

3600* Project Tinkertoy. *Communication Engineering*, v. 13, Nov.-Dec. 1953, p. 22-25, 46, 48.

Describes mechanized production of electronic products. Photographs, diagram.

3601 Designing Springs for Optimum Performance. Frank A. Votta, Jr. *Electrical Manufacturing*, v. 52, Dec. 1953, p. 93-97.

Describes procedure for selecting type of spring and determining load conditions. Graphs, photographs, table.

3602* Post Buckling Behaviour of Long Square Boxes Under Torsion. B. H. Falconer. *Engineer*, v. 196, Nov. 27, 1953, p. 690-694.

A theoretical study of non-linear behaviour in torsion of long, uniformly thin-walled, unstiffened boxes of square cross section. Approximate solution was obtained by considering strain energies of stretching and bending of wall plating which would be associated with an assumed mode of buckling. Graphs, diagrams. 11 ref.

3603* The Isodynamometer. J. Wright. *Engineering*, v. 176, Nov. 20, 1953, p. 665-667.

Results of tests described show that the isodynamometer technique is a promising addition to model analysis methods which are already available to the structural engineer. Tables, diagrams. 5 ref.

3604* Control Valves for High Air-Mass Flows. F. E. Swain. *Engineering*, v. 176, Dec. 4, 1953, p. 705-706.

Discusses design of valves for pipelines ranging from 1 to 5 ft. in diameter, operating at pressures of 1 to 20 atmospheres. Diagrams, photographs.

3605* The Vibrations of Machine-Tool Structures. S. A. Tobias and W. Fishwick. *Engineering*, v. 176, Dec. 4, 1953, p. 707-712.

Includes tables, graphs, diagrams.

3606 Semi-Graphical Method for the Study of Damped Three-Mass Systems. W. Kurzemann. *Engineers' Digest*, v. 14, Nov. 1953, p. 421-423. (Translated from *Maschinenbau und Wärmewirtshaft*, v. 8, no. 7, July 1953, p. 187-193.)

Describes the use of vector diagrams for study of forced vibration conditions.

3607* Industrial Noise. *Factory Management and Maintenance*, v. 3, Dec. 1953, p. 113-136.

Includes "Legal Problems", Noel S. Symons; "Noise Deafness",

Mechanical Engineering

George E. Shambaugh, Jr.; "Noise Measurement", Charles R. Williams; "Noise Standards", James H. Sterner; "Hearing Tests", Aram Glorig; and "Noise Abatement", D. B. Callaway.

3608* Food Automation Nears. Lloyd E. Slater. *Food Engineering*, v. 25, Dec. 1953, p. 73-77.

Reports increasing trend in food industry toward use of small, compact, electronic equipment. Photographs.

3609 Temperatures at His Finger-Tips. C. L. Gier. *Heating, Piping & Air Conditioning*, v. 25, Dec. 1953, p. 78-79.

Centralized monitoring of readings throughout air conditioned building saves money, promotes efficiency and comfort. Photographs.

3610* Advancing Process Control. C. W. Worley and G. W. McKnight. *Instrumentation*, v. 7, no. 1, 1953, p. 21-28.

A discussion of system engineering that explains feedback control and one of its techniques, frequency response testing. Graphs, diagrams.

3611 Centrifugal Pumps. Pump Materials. Igor J. Karassik and Roy Carter. *Industry and Power*, v. 65, Dec. 1953, p. 82-84.

Conditions of service and nature of liquid to be handled will determine most satisfoctory materials to be used in construction. Diagram, table.

3612 Design and Application of Bronze Slippers in Universal Couplings. J. Robert Lottes. *Iron and Steel Engineer*, v. 30, Dec. 1953, p. 123-128; disc., p. 128.

Case histories reported indicate that proper alloy selection can increase slipper performance and reduce costs. Diagrams, photographs, graphs.

3613* Thermal Calculation of Piston Air Compressors Based on the Theory of Similarity. (Russian.) I. D. Liaskovskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 10, Oct., p. 1452-1455.

Relations are derived for use in design problems. Graphs. 3 ref.

3614 Transactions of the First Conference on Mechanisms. *Machine Design*, v. 25, Dec. 1953, p. 173-220.

Includes "Mechanisms and Their Classification", Allen S. Hall, Jr.; "Recognition and Treatment of Acceleration", A. R. Holowenko; "Application and Design of Noncircular Gears", H. E. Peyrebrune; "Utilizing Irregular Gears for Inertia Control", W. W. Sloane; "A Simplified Approach to Linkage Design", Philip T. Nickson; "Designing Cams With Aid of Computers", R. F. Griffin; and "Systematic Correlation of Motions", James R. Longstreet.

3615 New Approaches to Variable-Speed Drives. Charles E. Kraus. *Machine Design*, v. 25, Dec. 1953, p. 232-246.

Report on fundamental research in metal-to-metal friction drives and application of findings to new types of speed changers. Photographs, diagrams.

3615a Metal Powder Friction Materials in Heavy Duty Transmissions. J. E. Storer. *Metal Powder Association, Proceedings*, 1953, p. 49-59; disc., p. 59. (TN695 M56p)

Discusses tests and properties of different types of clutches. Photographs, graphs.

3616 Factors Affecting Dual Pump Installations. John A. Queen. *Petroleum Engineer*, v. 25, Dec. 1953, p. B80, B83-B84, B86-B87.

Study of economics of lifting method shows significant savings possible with proper selection of equipment. Tables.

3617 Precision Fuel Pump Control For ASTM Aviation. N. F. Nichol. *Petroleum Engineer*, v. 25, Dec. 1953, p. C38.

Simple mechanical arrangement permits most exacting control in carrying out ASTM Aviation fuel test method designation D-909 (supercharge). Photographs.

3618 Designing Curved Surfaces. Henry R. Wall. *Product Engineering*, v. 24, Dec. 1953, p. 168-171.

Method described permits control of surfaces at drawing stage by manipulating lines that show trend of finished shape. Diagrams. 3 ref.

3619 Torque Capacity and Design of Cone and Disk Clutches. A. F. Gagne, Jr. *Product Engineering*, v. 24, Dec. 1953, p. 182-187.

Includes graphs, diagrams, tables.

3620 Two Approaches to Mechanization. *Steel*, v. 133, Dec. 14, 1953, p. 122-124.

Hotpoint's new refrigerator plant adds some new chapters to the industry's book of mass production recipes. Curtiss-Wright shows how a non-consumer product can emerge profitably from a mechanized, automated line. Photographs.

Books and Miscellaneous Publications

3621 Advanced Mechanics of Materials. 2nd Ed. Fred B. Seely and James O. Smith. 680 p. 1953. John Wiley & Sons, Inc., New York. (TG265 Se35a2)

Includes chapters on analysis of subject; elementary stress formulas for static loads; stresses and strains at a point—theories of failure by yielding; shear center for a cross section of a beam; unsymmetrical bending; curved flexural members; beam on continuous elastic support; flat plates; torsional resistance of bars having non-circular cross sections; thick-walled cylinders; contact stresses; values and significance of localized stresses in various members; considerations of energy principles for determining relations between loads and deflections; deflection of members and simple structures by Castigliano's theorem; deflection of members and simple structures by unit load or dummy load method; forces and moments in statically indeterminate members and structures; effect of small inelastic strains in axially loaded members and in straight beams effect of small inelastic strains for combined bending and axial loads; introduction to ultimate load analysis of statically indeterminate members; elastic and inelastic buckling of columns; and buckling of cylindrical tubes under uniform external pressure.

See also:
3144 (design of pumps for corrosive fluids)
3146 (electrical servomechanisms)
3313 (stall and surge in axial flow compressors)
3529 (elimination of torsional vibration)
3530 (piston design)
3914 (automatic recording instruments)

METALLURGY

3622* A View on Titanium Metallurgy. (Italian.) P. Spinedi. *Alluminio*, v. 22, no. 5, Oct. 1953, p. 523-537.

Discusses problems of economical mass production of pure Ti. Tables, graphs, diagrams. 46 ref.

3623 Body Engineers Technical Convention. James R. Custer. *Automotive Industries*, v. 109, Dec. 1, 1953, p. 48-49, 106.

Discusses plastic dies, reinforced plastic bodies, Al die castings, air conditioning, and other timely developments. Graphs.

3624* Aluminum Conductors in Telephone Cable. C. Kreisher. *Bell Laboratories Record*, v. 31, Dec. 1953, p. 465-469.

Presents description of properties of Al, advantages of its use in cable conductors, and difficulties encountered in this application. Graph, photographs.

3625* The Proper Utilization of Aluminum Alloys in the Chemical and Food Industry. (German.) K. Renner. *Chemische Technik*, v. 5, no. 9, Sept. 1953, p. 521-525.

Describes processing, application, and properties of Al alloys for reduced consumption of pure Al. Examples of application are described. Diagrams, graphs, photographs, tables. 9 ref.

3626 Magnesium Castings. P. E. Moluf. *Electrical Manufacturing*, v. 52, Dec. 1953, p. 98-99.

Reviews properties, production methods, and typical applications of cast Mg parts for electrical equipment. Photographs, tables.

3627* B.I.S.R.A. Laboratories at Sheffield. *Engineer*, v. 196, Nov. 27, 1953, p. 694-697.

Describes equipment for studying the making, working, and metallurgy of steel. Photographs.

3628* Titanium—A Metal of Engineering Importance? P. L. Teed. *Engineering*, v. 176, Nov. 13, 1953, p. 635-637.

Discusses engineering features of Ti and its alloys; civil aircraft costs; and uses of Ti and its alloys in aircraft and aircraft engines. Tables. 7 ref.

3629* Sheffield Laboratories of British Iron & Steel Research Association. *Engineering*, v. 176, Nov. 27, 1953, p. 683-685, 688.

Describes laboratory facilities including cold strip-rolling mill, hydraulic forging press, wire drawing machine, melting furnaces, and testing equipment. Photographs.

3630* High Alloy Castings Resist High Temperature. *Engineering Journal*, v. 36, Nov. 1953, p. 1473-1474.

Briefly discusses Fe-Cr and Fe-Cr-Ni alloys. Describes compositions and applications in recuperators and retorts.

3631* Melting Lathe Chips by the Crofts Method. (Swedish.) *Gjuteriet*, v. 43, no. 9, Sept. 1953, p. 168-169.

Describes special feeding and mixing device for heating the chips to melting point in a nonoxidizing zone. Photographs, diagrams.

3632* Platinum in the Finishing, Jewellery and Metallurgical Industries. *Industrial Finishing (London)*, v. 6, Nov. 1953, p. 282, 284-286, 288.

Discusses use of Pt metals in jewelry, electrical contacts, electrodes, thermocouples, and artistic and decorative items. Photograph.

3633 The New Metal Titanium. Maurice Cook. *Institute of Metal, Journal*, v. 82, Nov. 1953, p. 93-106.

A general review of history, occurrence, reduction processes, melting, properties, alloys, and applications. Graphs, diagrams, tables.

3634* All-Around Alloy. L. T. Troutman. *Instrumentation*, v. 7, no. 1, 1953, p. 40-41.

Describes production, properties, and applications of BeCu. Photographs.

3635 Newer Types of Metallic Recuperators. H. Weineck. *Iron & Steel*, v. 26, Dec. 1953, p. 557-560.

Describes construction and use of recuperators made of cast iron, steel, and heat resistant alloys. 8 ref.

3636 Allegheny Ludlum. T. J. Ess. *Iron and Steel Engineer*, v. 30, Dec. 1953, p. 87-102.

Describes equipment, plant layout, and operating procedures of two steel mills. Photographs, tables, diagrams.

3637 Expansion at the Steel Company of Wales. T. J. Ess. *Iron and Steel Engineer*, v. 30, Nov. 1953, p. 105-120.

Describes facilities, including coke plant; blast- and open-hearth furnaces; slabbing and hot strip mills; and strip finishing equipment. Photographs, diagrams, tables.

3638* Solubility of Oxygen in Iron-Chromium and Iron-Chromium-Nickel Melts. (Russian.) B. V. Linchevskii and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 5, May, p. 691-704 + 4 plates.

Studies were made of influence of Cr on oxygen solubility. Oxidation equations for Cr dissolved in liquid iron are presented. Tables, graphs, micrographs. 3 ref.

3639 Specifications Relating to Aluminium and Magnesium. *Light Metals*, v. 16, Nov. 1953, p. 368-370.

A list of revisions to indexes and schedules of specifications originally published in *Light Metals*, 1953, v. 16, p. 121.

3640 Titanium Metal and the Future. *Light Metals*, v. 16, Nov. 1953, p. 378-379.

A general review. Describes production, forming, costs, and problems of scrap utilization. (To be continued.)

3641* Production of Permanent Magnets in a Modern Plant. *Machinery*, v. 60, Dec. 1953, p. 208-210.

Describes fabrication procedures employed at Carboloy department of General Electric Company. Photographs.

3642 Non-Ferrous Materials for Springs. J. Lomas. *Machinery Lloyd (Overseas Ed.)*, v. 25, Nov. 21, 1953, p. 74-77.

Discusses composition and properties of Be Cu and Ni alloys.

3643 Which Stainless Steel? Richard E. Paret. *Materials & Methods*, v. 38, Dec. 1953, p. 98-101.

Corrosive environoment, service conditions, and fabrication methods must be considered in deciding which grade of steel is most suitable for given application. Photographs.

3644 High Temperature Materials for Vacuum Service. Herbert B. Michaelson. *Materials & Methods*, v. 38, Dec. 1953, p. 110-115.

Special properties required of materials for service in vacuum include low vapor pressure, stability, low gas permeability, and ease of outgassing. Photographs, tables, graphs, diagram. 10 ref.

3645 Enginering Coppers. John L. Everhart. *Materials & Methods*, v. 38, Dec. 1953, p. 123-138.

Reports development of modified coppers to take advantage of one or more of its properties of high electrical and thermal conductivity, corrosion resistance, and ease of working and joining. Discusses commercial grades, engineering properties, applications, forming and fabricating, joining practice, and cleaning and finishing. Photographs, tables, graph.

3646 Carbon Molybdenum Steels—Materials Data Sheet. *Materials & Methods*, v. 38, Dec. 1953, p. 143.

Includes composition; physical, mechanical, and fabricating properties; thermal treatment; corrosion resistance; and applications of five alloy steels.

3647 The Development of a Copper-Silver-Lead Alloy for Bearings. G. Llewelyn. *Metallurgia*, v. 48, no. 289, Nov. 1953, p. 215-220.

Tests showed that a Cu-Ag-Pb alloy containing 30% Ag and 40% Pb possesses most of the usual properties associated with bearing alloys. Graphs, photographs, tables, micrographs. 8 ref.

3648 Carbon in the Engineering and Metallurgical Industries. IV. Refractories, Electrodes and Other Metallurgical Uses. V. S. Kingswood. *Metallurgia*, v. 48, no. 289, Nov. 1953, p. 221-227.

Describes applications of carbon in iron and steel making and heat treating. Discusses fabrication of carbide tools. Photograph, diagrams, graphs, tables. 21 ref.

3649 Review of the Major Plant and Equipment Installed in the Sheffield Laboratories. *Metal Treatment and Drop Forging*, v. 20, Nov. 1953, p. 498-504.

Describes melting facilities and metalworking research unit. Photographs.

3650* Aluminum in Communication Systems. E. Glaus. *Modern Metals*, v. 9, Nov. 1953, p. 34-35, 38.

Deals with use of Al in tele-communications by the Swiss. Latest and most promising developments are in the field of high frequency transmission. Photographs.

3651* Magnesium Gains in Die Casting Field. George Hodgson. *Modern Metals*, v. 9, Nov. 1953, p. 40, 44, 46, 48.

Magnesium is no longer a "substitute" material. It is accepted on an equal status with Zn and Al. Economic factors now favor Mg in many applications. Diagrams, table, photographs.

3652* The Aluminum Smelting Industry. *Modern Metals*, v. 9, Nov. 1953, p. 54-56, 58, 60, 62-64.

Describes history, growth, technology, alloys, markets, and outlook. Graphs, table, photographs.

3653* Britain's Biggest Aluminum Fabricator. *Modern Metals*, v. 9, Nov. 1953, p. 72-74, 76, 78, 80, 82.

A general description of facilities of the Aluminum Company of Canada, Ltd. Includes furnace installations; foundries; forging and extrusion operations; sheet and rolling mills; and powder production. Photographs.

Metallurgy

3654* How to Choose a Light Foundry Alloy. (French.) Charles Roinet. *Revue de l'Aluminium*, v. 30, no. 203, Oct. 1953, p. 375-378.

Presents in two tables; mechanical and physical characteristics; chemical properties; casting and machining possibilities, and aptitude to surface treatment of 18 alloys.

3655 "The New Metal Titanium". *Sheet Metal Industries*, v. 30, no. 320, Dec. 1953, p. 1029-1032, 1076.

Extracts from the Autumn Lecture given to the Institute of Metals by Dr. Maurice Cook. Graphs, photographs, table.

3656* The Metallurgical and Other Industrial Applications of Manganese and Its Ores. R. A. Dodd. *South African Mining and Engineering Journal*, v. 64, pt. 2, Oct. 10, 1953, p. 205, 207.

Discusses occurrence, composition and classification of Mn ores. Utilization of 90% of world production of Mn ore by steel industry is reported.

3657 Scrap Preparation. Key to Quality and Economic Control. E. W. Hunziker. *Steel*, v. 133, Dec. 7, 1953, p. 145, 148, 150, 153.

Discusses types of scrap for steelmaking and effect of scrap preparation on open-hearth production. Graphs, photographs, table.

3658 Thorium Improves Magnesium Alloys. *Steel*, v. 133, Dec. 14, 1953, p. 126, 128.

Castings made with experimental alloys indicate they will be easier to handle than rare earth alloys. Thorium makes alloying with Zr easier and ups recoveries. Tables.

3659* The Chromium-Silicon System, and Some Silicide Solid Solutions. (German.) Richard Kieffer, Friedrich Benesovsky, and Hermann Schroth. *Zeitschrift für Metallkunde*, v. 44, no. 10, Oct. 1953, p. 437-442.

Production of specimens by hot pressing and melting is described. Discusses scaling behavior and physical properties. Preliminary phase diagram is plotted on basis of melting point and structural and radiographic investigations. Investigations are reported on $CrSi_2$-$TiSi_2$, $CrSi_2$-$TaSi_2$, and Cr_3Si-Mo_3Si. Tables, micrographs. 31 ref.

Books and Miscellaneous Publications

3660 Engineering Metallurgy. Bradley Stoughton, Allison Butts, and Ardrey M. Bounds. 4th Rev. Ed. 479 p. 1953. McGraw-Hill Book Co., New York, N. Y. (TN665 St76e4)

Covers metals as materials of construction; sources of metals; sizing and shaping metallic bodies; welding and joining metallic bodies; metallurgical inspection and testing; theory of alloys; heat-treatment of metals and alloys; properties and uses of iron, steel, and nonferrous metals; examples of application of metals in engineering service; corrosion and its prevention; producing and refining iron, steel, and nonferrous metals; furnaces, refractories, and fuels; and measurement of temperature in industrial operations.

3661 The Theory of Metals. A. H. Wilson. 2nd Ed. 346 p. 1953. Cambridge Univ. Press, London. (TN665 W69t2)

Contains chapters on motion of an electron in a perfect crystal lattice; metallic structures; structure of alloy; semi-conductors; thermal and magnetic properties of metals; ferromagnetism; formal theory of conduction; mechanism of conductivity; application of the variation principle to conduction phenomen; and Fermi-Dirac statistics.

See also:
3579 (alloys for automobile bearings)
3699 (recovery of Cu from residues and scrap)

METALS—EXTRACTION AND REFINING

3662* Production and Properties of Alloying Materials Necessary for the Manufacture of Manganese-Aluminum Alloys. (Hungarian.) András Domony and Rezsó Várhelyi. *Aluminium (Budapest)*, v. 5, no. 11, Nov. 1953, p. 236-241.

Places emphasis on the importance of keeping out Fe. Practical details of various processes are outlined. Micrograph, tables, graphs. 10 ref.

3663 Low-Shaft Furnaces. Georg Bulle. *Blast Furnace and Steel Plant*, v. 41, Dec. 1953, p. 1429-1433.

Describes studies undertaken on European continent regarding use of low-shaft blast furnaces to smelt pig iron. Proposes advantages and discusses limitations. Diagrams.

3664 Sinter For Open Hearth Charge. E. G. Hill. *Blast Furnace and Steel Plant*, v. 41, Dec. 1953, p. 1434-1436, 1438.

Describes need and use of sinter and its manufacture. Tables.

3665 Recuperators For Blast Furnaces. W. Trinks. *Blast Furnace and Steel Plant*, v. 41, Dec. 1953, p. 1437-1438.

Describes early attempts to install recuperators in connection with blast furnaces. Discusses present impracticality.

3666 Construction and Operation of Carbon Lining in Gary's No. 10 Blast Furnace. J. M. Walsh, Jr. *Blast Furnace and Steel Plant*, v. 41, Dec. 1953, p. 1439-1450.

Discusses changes in furnace design, lining construction, curing the carbon, blowing in, and operation of furnace. Photographs, diagrams, tables, graphs.

3667 Melting Metals Under Vacuum. *Canadian Metals*, v. 16, Dec. 1953, p. 16, 18, 20.

Describes induction furnace and facilities for pouring molten steel inside a vacuum container. Photographs, diagrams, graph.

3668* Precipitation of Vanadium From Aqueous Vanadate Solutions by Reduction With Hydrogen. R. N. O'Brien, F. A. Forward, and J. Halpern. *Canadian Mining and Metallurgical Bulletin*, v. 46, no. 499, Nov. 1953, p. 673-676; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 56, 1953, p. 359-362.

Presents details of process. Discusses effects of catalyst, hydrogen pressure, temperature, and solution composition. Graphs, tables. 7 ref.

3669* Ammonia Pressure Leach Process for Recovering Nickel, Copper, and Cobalt From Sherritt Gordon Nickel Sulphide Concentrate. F. A. Forward. *Canadian Mining and Metallurgical Bulletin*, v. 46, no. 499, Nov. 1953, p. 677-684; disc., p. 684; *Canadian Institute of Mining and Metallurgy, Transactions*, v. 61, 1953, p. 363-370.

Describes details of work carried out in laboratories and pilot plants. Indicates initial cost of development. Predicts savings from adoption of process. Tables, diagram, graphs.

3670* Blast-Furnace Operation With Oxygen. (German.) E. Diepschlag. *Chemische Technik*, v. 5, no. 10, Oct. 1953, p. 591-592.

General review of problem and investigations. Complexity of process and resulting ambiguity of conclusions concerning usefulness of application of oxygen are outlined.

3671* The State of Alumina in Melted Slags. (Russian.) O. A. Esin and B. I. Lepinskikh. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1187-1190.

Explains a series of congruent-melting compounds including 5 $CaO \cdot 3Al_2O_3$, 2 $CaO \cdot Al_2O_3 \cdot SiO_2$, and $CaO \cdot Al_2O_3 \cdot 2SiO_2$ in addition to $CaO \cdot Al_2O_3$. Graphs. 5 ref.

3672* Steel-Making Processes. James Mitchell. *Engineer*, v. 196, Nov. 20, 1953, p. 655-658.

Discusses trends in methods of producing steel. States case for multiplication of units such as blast-furnaces and steel furnaces rather than for an increase in unit size. Stresses that basic Bessemer process should be given more serious consideration as an alternative to basic open-hearth. Pre-refining and duplexing methods for intermediate phosphorus irons are critically discussed. Tables.

3673 Cobalt at Fredericktown. George P. Lutjen. *Engineering and Mining Journal*, v. 154, Dec. 1953, p. 72-76.

Describes equipment, plant layout, and operating procedures. Photographs, diagram.

3674 E&MJ Visits the General Superintendent at U.S.' Largest Titanium Mine. John H. Kearney and George P.

Lutjen. *Engineering and Mining Journal*, v. 154, Dec. 1953, p. 83-88.

Discusses equipment, plant layout, and operating procedure. Photographs.

3675 Review of European Operating and Technical Practices. III. William C. Bell. *Industrial Heating*, v. 20, Nov. 1953, p. 2211-2212, 2214, 2216, 2218, 2220, 2222, 2224.

European steelmaking processes concludes this series of articles. Tables.

3676* Industrial Tests Conducted at Kahlenberg, Germany, for the Enrichment of a Lorraine Ore by High Intensity Magnetic Separation. (French.) L. Coche. *Institut de Recherches de la Sidérurgie, Publications*, ser. A, no. 58, July 1953, 15 p. (TS300 In7p)

Results of tests with Mont-Saint-Martin fines indicate need for careful crushing of ore to lessen amount of very fine paricles and need for careful adjustment of apparatus. Tests showed that it was possible to eliminate more than half of the gangue while losing only 10% of the iron. Describes installations. Diagrams, tables, photographs.

3677* Magnetizing-Roasting Tests on French Iron Ores. (French.) P. Emery and J. Givaudon. *Institut de Recherches de la Sidérurgie, Publications*, ser. A, no. 60, Oct. 1953, 119 p. (TS300 In7p)

Discusses tests on low grade siliceous Micheville ore and Mont-Saint-Martin ore in the Iron and Steel Research Institute reactor and tests of the latter ore in a tray furnace. Fluidization phenomena is descried. Tables, graphs, diagrams.

3678* Heat for Open Hearths. M. F. Hall. *Instrumentation*, v. 7, no. 1, 1953, p. 8-9.

Instruments indicate, record, integrate, and automatically control flows of liquid and gaseous fuels. Photographs.

3679 Significance of Air Temperature in Open-Hearth Operation. John S. Marsh. *Instruments*, v. 26, Dec. 1953, p. 1876-1878, 1908, 1910.

A velocity thermocouple proves to be an accurate and sensitive tool for diagnosing open-hearth-furnace behavior. Its use shows that air temperature has large influence on heat time. Graphs, diagrams. 3 ref.

3680 Solidification of Steel. III. Casting Defects. T. B. King. *Iron & Steel*, v. 26, Dec. 1953, p. 562-568.

Discusses cracking, hot tearing, shrinkage, porosity, metal penetration, and sand burn-on ingots and castings. 65 ref.

3681 Symposium on Open Hearth Availability. *Iron and Steel Engineers*, v. 30, Nov. 1953, p. 55-59, 61-70; disc., p. 59-61, 65-66, 70.

Includes "Fuel and Its Usage", Edward E. Callinan; "Furnace Rebuilding", W. H. Shure; and "Furnace Design and Brickwork", H. C. Paxson.

3682 Large Electric Furnace of the Future May Be Six-Electrode Unit. Frank W. Brooke. *Iron and Steel Engineer*, v. 30, Nov. 1953, p. 123-124, 127, 129.

Describes furnace and gives advantages. Photographs, diagrams.

3683* Intensification of Flotation Processing of Sulfide Minerals. (Russian.) I. I. Zozulia. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 7, July, p. 964-968.

Wettability of surface can be effectively changed by means of gases formed in electrolytic dissociation of water directly in the pulp. Graphs, diagrams.

3684* Viscosity Mechanism of Blast-Furnace Slag. (Russian.) A. M. Chernyshev, L. M. Tsylev, and A. V. Rudneva. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 7, July, p. 1044-1057.

Viscosity of slag was determined by measurements of complex silicate slag ions. Tables, graphs. 10 ref.

3685* Activity of Carbon and Oxygen in Fe-C-O Melts. (Russian.) A. M. Samarin and R. A. Karasev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 8, Aug., p. 1130-1136.

Discusses relationship between activity coefficients of carbon and oxygen and dependence on carbon concentration. Tables, graphs. 3 ref.

3686* Investigation of Properties of Liquid Iron-Chromium Alloys by the Method of Electromotive Forces. (Russian.) O. A. Esin and N. A. Vatolin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 8, Aug., p. 1137-1142.

Properties of Fe-C-Ni-Chromium alloy of different compositions was investigated at 1460 C. Tables, graphs. 10 ref.

3687* Can the Electric Furnace Compete With the Open Hearth? C. F. Ramseyer. *Journal of Metals*, v. 5, Dec. 1953, p. 1617-1621.

Discusses operating costs and future possibilities. Graphs, photographs, tables.

3688* Review of Russian Practice Reveals Rail Steel Production Methods. Carl A. Zapffe. *Journal of Metals*, v. 5, Dec. 1953, p. 1627-1628.

Describes Russian work on flaking of steel forgings. Discusses theory and effect of hydrogen. Table.

3689* Gas Combustion Practice Described for Copper Smelters of the Southwest. Harold Foard. *Journal of Metals*, v. 5, Dec. 1953, p. 1629-1630.

Discusses burners, controls, and flame characteristics. Photographs.

3690* Sintering Zinc Concentrates on the Blackwell 12 by 168 Ft. Machine. A. E. Lee, Jr. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1631-1633.

Describes machine and its operation. Presents performance data. Diagram, photograph. 3 ref.

3691* Some Observations of Slag-Metal Relations in the Acid Open Hearth Steel Furnace. G. R. Fitterer. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1634-1640.

Reviews trends in slag composition in acid open-hearth practice, particularly variation in Fe and Mn oxides during refining. Explains partially, through slag phase diagram considerations, a procedure which is currently being used to control refining reactions. Graphs, table, heat logs. 16 ref.

3692* Solid Phase Identification in Partially Reduced Iron Ore. Gust Bitsianes and T. L. Joseph. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1641-1647.

Technique was developed for identifying solid phases in partially reduced iron ore. Reduction of dense iron ore was found to take place at distinct interfaces between well-defined layers of participating solid phases. Diagrams, tables, graphs, micrographs. 24 ref.

3693* Exchange of Iron Between Liquid Metal and Iron Silicate Slag. G. Derge and C. E. Birchenall. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1648-1650.

Using radioactive Fe^{55} as tracer, it was determined that equilibrium exchange of iron between silica-saturated iron silicate slag and liquid iron in a silica crucible follows first-order kinetics with a rate constant of 0.006 at 1600 C. Graphs. 6 ref.

3694* Electrolytic Production of Manganese. T. Banerjee. *Journal of Scientific & Industrial Research*, v. 12, sec. A, Oct. 1953, p. 457-462.

Describes equipment and operating procedures, including electrolytes, cells, electrodes, and power requirments. Diagram. 34 ref.

3695* Extraction of Thorium and Cerium From Monazite Sands of Travancore. I. R. K. Dutta. *Journal of Scientific & Industrial Research*, v. 12, sec. B, Oct. 1953, p. 485-488.

Describes laboratory method for preparation of thorium nitrate and cerium ammonium nitrate from Indian monazite. Tables. 6 ref.

Metals—Extraction and Refining

3696* Extraction of Thorium & Phosphoric Acid From Monazite Sands of Travancore. II. R. K. Dutta and N. K. Dutta. *Journal of Scientific & Industrial Research*, v. 12, sec. B, Oct. 1953, p. 488-490.

Describes laboratory method for preparation of thorium nitrate and phosphoric acid from Indian monazite. Tables. 5 ref.

3697* The Enriching of Manganese Mud With Simultaneous Desulfurization of Generator Gas. II. (Hungarian.) *Kohaszati Lapok*, v. 8, no. 8, Aug. 1953, p. 165-168.

Describes construction and operation of a pilot plant built for determining absorption of S from generator gas by means of Mn mud under industrial conditions. Manufacturing plan developed on basis of these observations is outlined. Technology of application to various muds and ores is indicated. Diagram, photograph. 13 ref.

3698* Physicochemical Processes of Oxygen During Introduction Into the Open-Hearth Furnace. (Hungarian.) O. J. Jacunszkaja and M. N. Sztarovics. *Kohaszati Lapok*, v. 8, no. 8, Aug. 1953, p. 168-176.

Describes modification of open-hearth process when gaseous oxygen is added. Discusses increase in rate of reduction of bath by direct oxidation, effect of various factors upon rate of oxidation of carbon and other elements, extent of metal oxidation, and significance of exothermal reactions. Tables, graphs. 19 ref.

3699 Refining Low-Grade Copper. *Metal Industry*, v. 83, Nov. 27, 1953, p. 441-442.

Describes processes and equipment for recovery from low grade ores, ash, residues, and scrap. Photographs.

3700* Conditions for Favorable Distribution of Materials in the Blast Furnace. (French.) Jean Vibrac. **II.** *Metallurgie et la construction mecanique*, v. 85, no. 10, Oct. 1953, p. 773, 775-777.

Discusses problems of grain size necessitating sifting of charges. Describes effect of grain size upon contact between solids and gases, permeability coefficient, passage of charge, and losses. Graph. (To be continued.)

3701* The Study of Conditions for a Good Distribution of Materials in the Blast Furnace. (French.) Jean Vibrac. *Métallurgie et la construction mecanique*, v. 85, no. 11, Nov. 1953, p. 851, 853-854, 857, 859, 861.

Presents a detailed discussion of loading apparatus; influence of method of loading on permeability; height of an optimum load; influence of the height of the level of loads; passage of gases at the throat; and diameter of the distribution bell. Graphs, diagrams. (To be continued.)

3702* Desulfurization Conditions in the Hot-Blast Cupola. (French.) Marcel Guédras. *Métallurgie et la construction mecanique*, v. 85, no. 11, Nov. 1953, p. 863, 865, 867.

Discusses advantages of using Mg liquid slags. Presence of pure dolomite when operating at 500 to 600 C assures production of high-quality melt.

3703 Steelmaking. I. Co-Operative Research in Steelmaking. A. H. Leckie. **II. Design and Operation of Open-Hearth Furnaces.** R. Mayorcas and A. H. Leckie. **III. Bessemer and Electric Steelmaking.** D. J. O. Brandt and W. H. Glaisher. **IV. Research on Process Chemistry.** C. E. A. Shanahan. **V. Ingots and Ingot Moulds.** W. H. Glaisher. *Metal Treatment and Drop Forging*, v. 20, Nov. 1953, p. 505-524.

Reviews developments in research conducted by the BISRA. Photographs, diagrams, micrographs. 35 ref.

3704* New Advances in Production of Pig-Iron in the Electric Low-Shaft Furnace. (German.) Hermann Walde. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1441-1446.

Discusses development of electric smelting. Compares low- and high-shaft blast furnaces. Gives compositions of burden, pig iron, and slag. Tables, diagrams, photographs. 5 ref.

3705* Improving Quality of Basic Converter Steel at the Iron and Steel Works at Domnarvet. (German.) Bo Kalling. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1446-1452.

Describes desulfurization of pig iron, cost calculations, prerefining, and variables affecting quality. Discusses effect of P, N, and low C contents. Photographs, tables, diagrams, graphs. 19 ref.

3706 Erie Starts Big Taconite Project. *Steel*, v. 133, Dec. 14, 1953, p. 82.

Financing plans are completed for a program aimed at producing 10.5 million tons annually.

3707 Mineral-Dressing Study of Manganese Ore, Cason Mine, Batesville, Ark. M. M. Fine and D. W. Frommer. *U. S. Bureau of Mines, Report of Investigations* 5005, Oct. 1953, 9 p. (TN21 Un3r)

Investigations were made on button and carbonate ores to determine degree of concentration that could be effected by modern methods. Tables. 5 ref.

See also:
2948 (lining of pig iron mixers)
2949 (lining of pig iron mixers)
2950 (lining of pig iron mixers)
3195 (switch-gear in iron and steel works)
4151 (dust collectors for steel foundries)

METALS—FINISHING, POLISHING, AND CLEANING

3708* Aluminum for Decorative Uses. (German.) D. Lenz. *Aluminium*, v. 29, no. 11, Nov. 1953, p. 451-461.

Discusses mechanical rough polishing and degreasing; electrolytical glazing; and chemical polishing. Graphs, tables, photographs, micrographs. 21 ref.

3709* Ultrasonic Cleaning. *Machinery*, v. 83, Nov. 20, 1953, p. 1000.

Describes cleaning apparatus. Photographs.

3710* Metal Cleaning of Fine Instrument Components. Edward A. Hedman and Arnold Miller. *Metal Finishing*, v. 51, Dec. 1953, p. 66-68.

Role of contaminants in deterioration of fine instruments is discussed. Experimental studies leading to development of suitable cleaner are described. 4 ref.

3711 Inhibitors for Metal Finishing. R. O. Bailey. *Metal Industry*, v. 83, Nov. 20, 1953, p. 421-422.

Deals with properties and effects of inhibitors used in acid solutions for pickling steel and ferrous alloys.

3712 Running a Production Test of Metal Cleaning Abrasives. *Metal-Working*, v. 9, Dec. 1953, p. 18-19.

Describes steps in determining overall efficiency of abrasives. Graphs, tables.

3713 Compressor Design and Performance Developments. B. T. Mast. *Petroleum Engineer*, v. 25, Dec. 1953, p. D28, D30-D31, D34, D36.

Recent gains in efficiency of gas engine reciprocating equipment has considerably altered comparative economic picture of reciprocating equipment with gas turbine, steam turbine, and electric motor driven compressors. Diagrams.

3714* Barrel Finishing. J. G. Reed. *Screw Machine Engineering*, v. 15, Dec. 1953, p. 53-56.

Discusses advantages and operating procedures. Photographs, table.

3715 Stretcher-Strain Markings in Aluminium Alloys and Methods for Their Elimination. V. A. Phillips. *Sheet Metal Industries*, v. 30, no. 320, Dec. 1953, p. 1048-1054.

Includes tables, photographs. 9 ref.

3716 Surface Treatment and Finishing of Light Metals. VIII. S. Wernick and R. Pinner. *Sheet Metal Industries*, v. 30, no. 320, Dec. 1953, p. 1055-1061.

Includes photographs, table. 31 ref. (To be continued.)

3717* Certain Peculiarities of Polishing of Chromium-Plated Parts. (Russian.) N. A. Kamenev and A. A. Mikhailov. *Stanki i Instrument*, v. 14, no. 7, July 1953, p. 20-23.

Wear resistance depends on nature of mechanical processing. Tables, graphs.

3718 Design for Longer Pickling Equipment Life. J. F. Revilock. *Steel*, v. 133, Dec. 21, 1953, p. 84, 86, 88.

Discusses applications of carbon and graphite in wet and dry pickling equipment. Gives design tips and performance data. Diagrams.

3719 Mechanical Descaling of Wire Rods Improves Coating. *Steel*, v. 133, Dec. 21, 1953, p. 114, 116-117.

Discusses descaling, drawing compounds, and diamonds used in drawing dies. Photograph.

METALS—FOUNDRY PRACTICE

3720 Gating to Control Pouring Rate and Its Effect on the Casting. F. J. McDonald. *American Foundryman*, v. 24, Dec. 1953, p. 36-41.

Describes studies of effect of pouring rate on quality of cast iron castings. Diagrams, photographs, tables.

3721 Catalytic Combustion Control in Core-Baking Oven. R. J. Ruff. *American Foundryman*, v. 24, Dec. 1953, p. 42-44.

Describes catalytic element and its use in flameless low-temperature burning of oil vapors. Graphs, photographs.

3722 Factors Influencing Riser Range and Feeding Adequacy. II. William S. Pellini. *American Foundryman*, v. 24, Dec. 1953, p. 62-71.

Summarizes studies on solidification of castings and riser action. Graphs, diagrams. 19 ref.

3723 How to Promote Safety in the Foundry. *Canadian Metals*, v. 16, Dec. 1953, p. 26-27, 30.

Describes how a foundry slashed accident rates by an intelligently planned and coordinated effort on the part of all from management to worker. Photographs.

3724* Lines in Steels With a High Chrome Content. (French.) M. Soubes. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques*, 1953, no. 11, p. 1763-1769.

Lines can be reduced by elaboration and basic casting in high-frequency furnaces. In the arc furnace, substitution of magnesia reduces inclusions. Micrographs, graphs, table.

3725* Foundry Practice. V. Moulding and Coremaking. William H. Salmon and Eric N. Simons. *Edgar Allen News*, v. 32, Nov. 1953, p. 255-256.

Describes mold-making machines. Diagrams. (To be continued.)

3726 Designing an Iron Foundry. Donald Appleyard and Stephen Rosenberg. *Foundry*, v. 95, Nov. 19, 1953, p. 619-621.

Account of how the authors set about this project and results of their deliberations. Diagrams, photograph.

3727 How Temperautre and Pouring Rate Effect Solidification of Bronze. Harold J. Roast. *Foundry*, v. 81, Dec. 1953, p. 107.

Describes methods of avoiding porosity in castings.

3728 Use of Shell Cores—In Casting Air-Cooled Engines. John L. Schmieder. *Foundry*, v. 81, Dec. 1953, p. 114-117.

Describes fabrication of hollow cores. Photographs.

3729 How to Avoid Trouble in the Aluminum Foundry. Donald L. LaVelle. *Foundry*, v. 81, Dec. 1953, p. 102-106, 259-267.

Discusses cause and prevention of defects due to molding and pouring practices. Photographs.

3730 Patternmaking for the Repetition Foundry. Robert R. Shaw. *Foundry Trade Journal*, v. 95, Nov. 26, 1953, p. 645-649.

Condensed text of paper presented before meeting of Institute of British Foundrymen. Presents brief discussion of various techniques necessary for different types of casting. Diagrams, photographs.

3731 Simplified Moulding. "Jacques". *Foundry Trade Journal*, v. 95, Nov. 26, 1953, p. 661-664.

Discusses advantages obtained from close co-operation of design department and molding shop. Diagrams.

3732 Shell Moulding of Cylinder Castings. A. Emmerson. *Foundry Trade Journal*, v. 95, Dec. 3, 1953, p. 687-696.

Describes pattern materials, cores, methods of reinforcing shells, and pouring procedures. Photographs.

3733* Efficiency of Coreless Low-Frequency Crucible Induction Furnaces for Gray Iron. (German.) F. Deutz. *Giesserei*, v. 40, no. 23, Nov. 12, 1953, p. 609-614.

Discusses current consumption and efficiency of 1.5, 3, and 6 ton furnaces from three typical foundries. Describes advantages of the coreless furnace. Tables, graphs, photographs.

3734* Systematizing Machine Molding of Small Castings. (Swedish.) E. O. Lissell *Gjuteriet*, v. 43, no. 9, Sept. 1953, p. 159-163.

Discusses properties of molding sand. Molding with stationary and portable machines are compared. Photographs, diagrams.

3735* Experiments With Different Types of Feeders. (Swedish.) Bertil Thyberg. *Gjuteriet*, v. 43, no. 10, Oct. 1953, p. 175-181.

Describes design and operation of new type pouring cup for casting malleable iron. Diagrams, micrographs, photographs.

3736* Exchangeable Pattern Plates in Frames. (Swedish.) Henry A. Nilsson. *Gjuteriet*, v. 43, no. 10, Oct. 1953, p. 182-184.

Discusses difficulties of producing small castings economically in mechanized foundry. Photographs, table.

3737 The Oxidation of Aluminium-Magnesium Alloys by Steam: A Contribution of Research on Mould Reaction. Marjorie Whitaker. **The Constitution of Oxide Films Formed at High Temperature on Aluminium-Magnesium-Beryllium Alloys.** A. R. Heath. *Institute of Metals, Journal*, v. 82, Nov. 1953, p. 107-116.

Describes research on methods of preventing reaction between Al-10% Mg alloy and steam atmosphere generated in a sand mold. Graphs, tables. 15 ref.

3738 Flow Properties of Foundry Sand. J. Gittus. *Iron & Steel*, v. 26, Dec. 1953, p. 551-553.

Describes effect of flow properties on mold fabrication. Interprets common terminology in terms of bond energy ratio. Photographs. 13 ref.

3739 Copper Castings. J. B. McIntyre. *Machinery*, v. 83, Nov. 13, 1953, p. 959-962.

Describes melting equipment, deoxidants, and pouring procedures. Graphs.

3740 Oblique Withdrawal and Ejection From Die Casting Dies. L. C. Barton and E. N. Field. *Machinery (London)*, v. 83, Nov. 27, 1953, p. 1061-1068.

Discusses factors affecting design of tool. Presents advantages, limitations, and applications of technique.

3741 Shell Moulds for Magnesium Castings. *Machinery (London)*, v. 83, Nov. 27, 1953, p. 1069-1070.

Discusses techniques employed and problems encountered in process.

3742 Quality in Light Metal Castings. *Machinery Lloyd (Overseas Ed.)*, v. 25, Nov. 21, 1953, p. 115-116.

Discusses dangers of lowering standards of quality and service in an attempt to fill increasing orders.

3743 Centrifugal Casting. New Foundry and Millspaugh Limited at Sheffield. *Metal Industry*, v. 83, Nov. 13, 1953, p. 397-399.

Describes equipment and plant layout. Photographs.

Metals—Finishing, Polishing, and Cleaning

3744 Gunmetal Pressure Test Failures. *Metal Industry,* v. 83, Nov. 20, 1953, p. 420.

Describes porosity defects in gunmetal castings. Recommends corrective measures. Photographs.

3745 Zircon Sand. M. R. Hinchcliffe. *Metal Industry,* v. 83, Nov. 27, 1953, p. 437-440.

Discusses merits as a core material for severe casting conditions. Graphs, photographs, diagram. 9 ref.

3746 Metal Casting Methods. VIII. Gating and Feeding Practice. J. B. McIntyre. *Metallurgia,* v. 48, no. 289, Nov. 1953, p. 241-246.

Deals with gating and feeding of sand casting and use of chills. Brief reference is made to jobbing and mechanized molding. Photographs, diagrams.

3747 Metal Melting Under Vacuum. Some Mechanical Problems Involved. *Metallurgia,* v. 48, no. 289, Nov. 1953, p. 259-260.

Discusses furnace construction, temperature measurement, and pouring procedures. Graph, diagram, photographs.

3748* The Cupola Furnace and the Superheating of the Cast Metal. (French.) J. Pascal. *Métallurgie et la construction mécanique,* v. 85, no. 10, Oct. 1953, p. 779, 781, 783-784.

Discusses superheating by means of oxygen enriched blast. Presents theoretical basis for the problem including an outline of thermal balance. Graphs, tables. 39 ref.

3749* Pressure Casting. (French.) Robert Girard. *Métallurgie et la construction mécanique,* v. 85, no. 10, Oct. 1953, p. 787, 789.

Outlines advantages and application of method. Diagrams.

3750* Lubrication and Casting of Tools in Pressure Casting. (French.) R. Grunberg. *Metallurgie et la construction mécanique,* v. 85, no. 11, Nov. 1953, p. 869, 871-872.

Discusses qualities of an ideal lubricant to assure both protection of cavity surface and good lubrication of moving die components. Outlines properties of silicones. Describes application of lubricants on the mold. Photographs.

3751* Magnesium Jet Engine Castings Made Pressure-Tight By Vacuum Impregnation. *Modern Metals,* v. 9, Nov. 1953, p. 50.

Describes impregnation with a thermosetting resin. Photograph.

See also:
3680 (defects in steel castings)

METALS—HEAT TREATMENT

3752* The Cooling Curve of Cast Iron With Spherical Graphite. (German.) Adalbert Wittmoser. *Archiv für das Eisenhüttenwesen,* v. 24, nos. 9-10, Sept.-Oct. 1953, p. 431-434.

Investigates discrepancies in cooling curves by different authors. Experiments reveal that disagreement was due to differences in graphite compoistion. Tables, graphs, photographs, diagrams. 15 ref.

3753 The Use of High Alloy Castings in Heat Treating Equipment. *Canadian Metals,* v. 16, Nov. 1953, p. 28, 30, 32.

Describes applications of Fe-Cr and Fe-Cr-Ni castings in recuperators, annealing retorts, and muffles.

3754 Electric Spark-Hardening of Tools. L. Y. Popilov. *Engineers' Digest,* v. 14, Nov. 1953, p. 424-425. (Translated from *Stanki i Instrument,* no. 5, 1953, p. 17-19.)

Describes method and discusses theory. Diagram, tables.

3755* Nitrided Casting. (French.) *Fonderie,* 1953, Oct., no. 93, p. 3655-3656.

Describes standards of casting compositions, thermic processes before nitriding, and the nitriding process. Tables, 5 ref.

3756 Annealing or Softening Improves Gray Iron Machinability. Charles O. Burgess. *Foundry,* v. 81, Dec. 1953, p. 108-111, 250.

Discusses mechanism of annealing and recommended annealing temperatures and times. Photographs, graphs, micrographs. 10 ref. (To be concluded.)

3757 Heat Treatment of Steel Castings. John Howe Hall. *Foundry,* v. 81, Dec. 1953, p. 126-129, 194.

Discusses Jominy test and effect of quenching and tempering. Graphs, tables, micrographs. 10 ref.

3758* Heat Treatment of Gears by the AC 1 Surface Hardening Process. (Czechoslovakian.) F. Poboril. *Hutnické Listy,* v. 8, no. 9, Sept. 1953, p. 450-454.

Method consists of isothermic hardening of gears made from practically eutectic low-alloyed steels after heating in a salt bath. Tables, graphs. 4 ref.

3759* Control of Heat Treatment in Large Forgings. (Czechoslovakian.) Stanislav Burda and Jaroslav Ruzicka. *Hutnické Listy,* v. 8, no. 9, Sept. 1953, p. 454-460 + 2 plates.

Describes methods of measuring temperatures and of testing sample. Tables, graphs, photographs, diagrams. 7 ref.

3760* Heat Treatment of Tool Steels. (Czechoslovakian.) Rudolf Stefec. *Hutnické Listy,* v. 8, no. 9, Sept. 1953, p. 461-464.

Discusses principles and ways of preventing distortion. Describes effects of residual austenite content. Graphs.

3761* Treatment of Tool Steels Below Freezing Point. (Czechoslovakian.) Otakar Morávek. *Hutnické Listy,* v. 8, no. 9, Sept. 1953, p. 464-470.

Describes experimental results. Suggests possibility of using method for other steels. Table, graphs, photographs, micrographs. 7 ref.

3762* Induction Heating of Rolled Pieces. (Czechoslovakian.) Emil Langer. *Hutnické Listy,* v. 8, no. 9, Sept. 1953, p. 470-475.

Discusses selection of suitable frequency and heating time. Diagrams, graphs, tables. 4 ref.

3763 Production Normalizing of Steel Forgings at Allison Engine Division. *Industrial Heating,* v. 20, Nov. 1953, p. 2164-2166, 2168, 2170. Includes photographs.

3764 An Evaluation of the Hardening Power of Quenching Media for Steel. II. Earl J. Eckel, Ross M. Mayfield, Glen W. Wensch, and Frank A. Rough. *Industrial Heating,* v. 20, Nov. 1953, p. 2192, 2194, 2196, 2198, 2200, 2202, 2204, 2206.

Describes Jominy end-quench hardenability test. Gives results of water, brine, oil, and air quenches. Graphs, tables, diagrams, photographs. (To be continued.)

3765 Savings by the Tank Car. Paul E. Peacock, Jr. *Industry and Power,* v. 65, Dec. 1953, p. 64-69.

Describes a bright annealing operation. Information and cost comparisons can be used for all applications which require equivalent amounts of ammonia. Photographs, tables, graphs.

3766* Sinews for the Stratojets. S. G. Andrews and H. H. Smith. *Instrumentation,* v. 7, no. 1, 1953, p. 4-7.

Describes heat treating operations to insure desired tensile strength and corrosion resistance of Al alloy parts used in medium bombers. Photographs, micrographs.

3767 Integrated Heat Treating and Machining Setup Triples Production. A. A. Fisk. *Iron Age,* v. 172, Dec. 3, 1953, p. 174-176.

Describes equipment, plant layout, and operating procedures. Photographs.

3768 Carbo-Nitriding and Gas Hardening. R. H. Warring. *Machinery Lloyd (Overseas Ed.),* v. 25, Nov. 21, 1953, p. 70-73.

Describes method of hardening which combines advantages of carburizing and nitriding. Graphs, tables.

3769 Nitriding Critical Steel Parts. Ralph Spagnola. *Materials & Methods*, v. 38, Dec. 1953, p. 96-97.

Describes improvement of core strength by heat treatment and surface hardening by nitriding resulting in increased wear resistance, fatigue strength, and bearing properties. Photographs.

3770 Bright Annealing. *Metal Industry*, v. 83, Nov. 20, 1953, p. 423-424.

Describes modern bell-type annealing furnace with heat recuperations. Photographs, diagrams.

3771* Gaseous Annealing of Malleable Castings. (Hungarian.) Elek Chapó. *Öntöde*, v. 4, no. 8, Aug. 1953, p. 165-170.

Various reactions involved in annealing white cast iron are discussed. Describes effect of gas atmosphere upon decarburation and graphitization; influence of H in furnace atmosphere, and effect of Mn-S ratio of Fe upon annealing rate. Table, graphs. (To be continued.)

3772* Metallographic Phenomena of Tempering and High-Speed Tempering. (Hungarian.) Ferenc Boda. *Öntöde*, v. 4, no. 11, Nov. 1953, p. 238-243.

Reports on investigations. Micrographs illustrate various structures. Tables. 9 ref.

3773 The Thermal Conductivity of Magnesium at Low Temperatures. W. R. G. Kemp, A. K. Sreedhar, and G. K. White. *Physical Society, Proceedings*, v. 66, no. 407A, Nov. 1953, p. 1077-1078.

Includes graphs. 10 ref.

3774* Study of Some Low-Alloy Steels Quenched Normally and in Stages. (French.) G. Delbart and F. Maratray. *Revue de métallurgie*, v. 50, no. 11, Nov. 1953, p. 781-806.

Studies were made of specimens of Mn-Si, Cr-Mn-Si, and CrV steels quenched in oil and tempered and quenched isothermally. Mechanical properties and Jominy hardenability of these steels were compared with those of more highly alloyed Cr-Mo and Ni-Cr-Mo steels. Tables, graphs. 3 ref.

3775* The Work of an Induction-Hardening Plant. (German.) K. Flick. *VDI Zeitschrift des Vereines deutscher Ingenieure*, v. 95, no. 31, Nov. 1, 1953, p. 1061-1065.

Describes process and advantages of induction hardening. Outlines practical data and materials suitable for process. Photographs, table, diagrams. 8 ref.

3776* Cold Hardening of Metal in a Static-Stressed State. (Russian.) D. A. Sveshnikov and A. M. Tarasov. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 67-70.

Studies were made of residual stresses from compression and direct hardening of surface layers. Discusses importance of each. Graphs, photographs. 5 ref.

See also:
3846 (effects of heat treatment on steel)
3949 (heat treatment temperatures related to Fe-C diagram)
3950 (annealing of metals)
4223 (applying electric heat)

METALS—MECHANICAL AND PHYSICAL PROPERTIES

3777* Shear Strength Test of Light Metals. (Italian.) G. Gatto. *Alluminio*, v. 22, no. 5, Oct. 1953, p. 495-506.

Describes a testing method which demonstrates value of shear breaking load. Photoelastic examination of stress conditions of sample indicated value of test. Tables, photographs, micrographs, diagrams.

3778* Aging Tests on Bar-Shaped Permanent Magnets at Different Temperatures. (German.) Klaus Kronenberg. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 9-10, Sept.-Oct., 1953, p. 441-446.

Describes investigation of aging effect of temperature (500 to —190C) on pseudo-remanence of different magnetic metals and alloys. Graphs, diagram, table. 19 ref.

3779* Some Aspects of the Effect of Copper in Cast Iron and Steel. June A. McNicol. *Australasian Engineer*, 1953, Oct., p. 54-60.

There is wide scope in the iron and steel industry for Cu-bearing materials. Graphs, photograph. 17 ref.

3780* Some Notes on Creep on High Temperature Alloys. W. T. Pether. *Australasian Engineer*, 1953, Oct., p. 95-99, 101, 103, 105, 107, 109.

Resumé of a paper presented to the Foundry and Metals Institute of Western Australia.

3781 A Note on the Ratio of the Quadrupole Moments of Li^6 and Li^7. N. G. Cranna. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1185-1186.

Includes diagram. 3 ref.

3782 Some Characteristics of Secondary Emission from BeCu. F. J. Fitz-Osborne. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1189.

Includes diagrams.

3783 Steel Testing and Design. II. W. A. Martin. *Canadian Metals*, v. 16, Dec. 1953, p. 36, 38.

Briefly discusses tests for determination of strength and ductility. 8 ref. (To be continued.)

3784 Some Considerations in Steel Testing and Design. W. A. Martin. *Canadian Metals*, v. 16, Dec. 1953, p. 42, 44.

Discusses design practice, embrittlement, mechanical tests, and transition temperatures. 3 ref.

3785* Application of Metallography to a Study on the Rupture of Tension-Test Specimens. (Spanish.) José Izaguirre Cobo. *Ciencia y técnica de la soldadura*, v. 111, no. 14, Sept.-Oct. 1953, 8 p.

Discusses influence of various chemical elements on mechanical properties of Cr-Ni stainless steel. Describes tension tests. Micrographs, diagrams.

3786* Comparative Effect of Traction and Compression on the Magnetic Properties of Alloy Steel. (French.) Georges Vidal and Pierre Lanusse. *Comptes rendus*, v. 237, no. 16, Oct. 19, 1953, p. 902-904.

Reports on investigation done on 0.10% C steel. Effects of traction and compression were plotted for various values of the inductor field. Graphs. 3 ref.

3787* Variation of the Magnetic Permeability of Soft Steel Subjected to Periodic Stress. (French.) Georges Vidal and Pierre Lanusse. *Comptes rendus*, v. 237, no. 20, Nov. 16, 1953, p. 1213-1215.

Describes tests with a specimen of annealed, 0.12% carbon steel, indicating existence of a reversible maximum of magnetic permeability under tension and absence of a similar characteristic under compression. Diagrams.

3788* The Presence of Preferred Micro-Domains of Attack in a Copper-Zinc Polycrystalline Solid Solution Very Slightly Deformed by Tension. (French.) Pierre-A. Jacquet. *Comptes rendus*, v. 237, no. 20, Nov. 16, 1953, p. 1248-1250.

Slip lines scarcely visible on electrolytically polished surface are revealed by a special etching technique.

3789* Influence of Change of Deformation Rate on Plastic Stretching. (Russian.) L. I. Vasil'ev, A. S. Bylina, and M. P. Zagrebennikova. *Doklady Akademii Nauk SSSR*, v. 90, no. 5, June 11, 1953, p. 767-769.

Discusses importance of rate on continued deformation. Graphs. 3 ref.

3790* Resistance of Metals to Plastic Deformation. (Russian.) Iu. I. Iagn and I. A. Chaplinskii. *Doklady Akademii Nauk SSSR*, v. 90, no. 6, June 21, 1953, p. 1023-1026.

Tests were conducted on pure Fe, steels, and Al bronze. Graphs. 5 ref.

3791* Role of Grain Boundaries in the Process of Plastic Deformation of Aluminum. (Russian.) E. S. Lakovleva and

Metals—Mechanical and Physical Properties

M. V. Iakutovich. *Doklady Akademii Nauk SSSR*, v. 90, no. 6, June 21, 1953, p. 1027-1029 + 1 plate.

Effects of changing conditions of deformation are described. Micrographs. 9 ref.

3792* Intermittent Deformation on the Linear "Elastic" Portion of the Tensile Strength Diagram. (Russian.) N. F. Siutkin. *Doklady Akademii Nauk SSSR*, v. 91, no. 1, July 11, 1953, p. 83-85.

Testing was done on aged and tempered wire. Tempering was done from 375 C into 15 C water and aging time was 250 hr. Graphs. 3 ref.

3793* Problem of the Nature of the Fracture Strength of Metals. (Russian.) V. A. Pavlov. *Doklady Akademii Nauk SSSR*, v. 91, no. 2, July 11, 1953, p. 253-255.

Studies were made of change of metal properties during plastic deformation by measuring ratio of impact strength to magnitude of plastic deformation. Graphs. 4 ref.

3794* Microhardness of Diffused Silicon Coatings. (Russian.) N. S. Gorbunov, A. S. Akopdzhanian, and N. A. Izgaryshev. *Doklady Akademii Nauk SSSR*, v. 91, no. 2, July 11, 1953, p. 285-286.

The greater the amount of carbon in the covered metal the greater the microhardness of the diffused Si coating. Graphs, micrographs. 3 ref.

3795* Influence of Plastic Deformation Arising During the Decomposition of a Solid Solution on the Rate of Growth of the Nucleus of a New Phase. (Russian.) L. N. Aleksandrov and B. Ia. Liubov. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 519-522.

Influence of stress state generated by transformation itself gives the process an auto-catalytic character. 7 ref.

3796* Effect of Temperature on Light Absorption in Thin and Ultra Thin Layers of Silver. (Russian.) A. G. Gumeniuk. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 783-786.

As a result of heating Ag layers at 230 C, surface migration of particles leads to their coalescence and formation of metallic particles. Tables, graphs. 9 ref.

3797* Characteristics of the Superconducting Modification of Bismuth. (Russian.) N. V. Zavaritskii. *Doklady Adademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 787-790.

A relationship was noticed between thinness of a specimen and its superconductivity. Temperature of 6 to 10 or 11 K were used to induce superconductivity. Diagram, graphs. 8 ref.

3798* Theory of Magnetisability of Thin Metal Layers at Low Temperatures. (Russian.) I. M. Lifshits and A. M. Kosevich. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 795-798.

Examines magnetic properties of a metal of finite thickness. 10 ref.

3799* Phase Transformation by Method of Internal Friction. (Russian.) K. M. Rozin and B. N. Finkel'shtein. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 811-812.

Comparison of internal friction changes and electrical resistance of a tempered specimen at 800 C showed that in 2.5 hr. electrical resistance decreased by 1.3% while internal friction increased by 180%. Graphs. 2 ref.

3800* Complex Manifestation of Plastic Deformation of Monocrystals. (Russian.) A. B. Zemtsov, M. V. Klassen-Nekliudova, and A. A. Urusovskaia. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 813-816 + 1 plate.

Translucence of TlBr and TlI in visible rays and possibility of studying them in polarized light permitted demonstration of mechanics of deformation. Micrographs, diagrams. 8 ref.

3801* Certain Physical Properties of Pb-Sb Alloys. (Russian.) V. A. Iurkov. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 891-893.

Describes results of investigations of linear expansion, density, electrical resistance, and thermo-electromotive force of Pb-Sb alloys. Increase of Sb decreased thermo-electromotive force. Graphs. 5 ref.

3802* Melting Points of Tin and Lead Under Pressures up to 34000 Kg. Per Cm^2. (Russian.) V. P. Butuzov and M. G. Gonikberg. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1083-1084.

Melting point increased with pressure. Lead reached a maximum of 532 C. Graphs, table. 4 ref.

3803* Influence of the Size Relationship of Friction Surfaces and Degree of Hardness on the Slide Conditions of Machine Parts in Contact. (Russian.) D. N. Garunov and I. V. Kragel'skii. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1085-1088.

Friction pairs such as copper on Al, steel on Al, and steel on chrome steel were investigated. Diagrams, tables, graphs, micrographs. 3 ref.

3804* Surface Tension and the Heat of Evaporation of Metals. (Russian.) S. M. Zadumkin. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 115-118.

Establishes connection between surface tension and heat of sublimation. Tables. 9 ref.

3805* Properties of a Thinly Rolled Permalloy. (Russian.) L. I. Rabkin and P. I. Iuzvinskaia. *Elektrichestvo*, 1953, no. 10, Oct., p. 63-67.

Presents results of experimental investigations of properties of sheet permalloy for medium and high frequencies. Graphs, diagram.

3806 Fatigue Testing of Wire Ropes. U. Rossetti. *Engineers' Digest*, v. 14, Nov. 1953, p. 425-426, 444. (Translated from *l'Ingegnere*, v. 27, no. 7, July 1953, p. 769-711.

Describes apparatus which can be used for standard fatigue strength tests, as well as for determination of effects of different types of dynamic load conditions. Diagrams, tables.

3807 A Survey of Rapid Fatigue Test Methods. G. Vidal. *Engineers' Digest*, v. 14, Nov. 1953, p. 433-435. (Translated from *La Recherche Aeronautique*, no. 34, July-Aug. 1953, p. 49-54.)

Concludes no accelerated method gives a reliable indication of fatigue limit. However, with caution, some of these methods may be used as approximations, thereby reducing number of tests required by the strict method. Graphs, diagrams. 14 ref.

3808 Influence of Section Size on the Strength Properties of Non-Ferrous Sand Castings. W. J. Reichenecker. *Foundry*, v. 95, Nov. 19, 1953, p. 627-628.

Includes graphs, table, diagram.

3809 Calculating Flexibility for Straight Line Piping Elements. L. E. Partch. *Heating, Piping & Air Conditioning*, v. 25, Dec. 1953, p. 74-77.

Includes diagrams, photographs.

3810* Silver Brazed Cutting Tools Withstand Shock and Vibration. *Industry & Welding*, v. 26, Dec. 1953, p. 66-68, 70, 72-73.

Induction brazing has many advantages when volume warrants extra equipment. Diagrams, photograph.

3811 Some Creep Characteristics of a Group of Precipitation-Hardening Alloys Based on the Alpha-Copper-Aluminium Phase. J. P. Dennison. *Institute of Metals, Journal*, v. 82 Nov. 1953, p. 117-128.

Hardness and metallographic data were used to investigate structural changes occurring on reheating solution-treated alloys, including specimens cold worked before ageing. Graphs, tables.

3812 In Carburized Bars—How to Develop Favorable Stress Patterns. II. J. E. Campbell and H. O. McIntire. *Iron Age*, v. 172, Nov. 26, 1953, p. 102-105.

Patterns were determined for pack, gas, and liquid carburized bars after various quenching and tempering treatments. Graphs, tables.

3813 How to Improve Bending Properties of Titanium Strip. W. M. Baldwin, Jr. *Iron Age*, v. 172, Dec. 3, 1953, p. 165-167.

Embrittlement resulting from oxygen and nitrogen absorption during annealing or hot rolling was corrected by removing a thin layer of surface metal by grinding or pickling. Graphs. 4 ref.

3814* Calculation of Strength of Jointed Eccentric Pipes and Conduits. Determination of Stresses in Jointed Pipes Caused by Press Fitting and Stresses in a Semiplane With a Circular Hole. (Russian.) N. D. Tarabasov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 7, July, p. 949-963.

Formulae are presented for component stresses. Diagrams, tables. 6 ref.

3815* Poisson's Ratio During Stress Relaxation. (Russian.) B. M. Rovinskii and V. G. Liuttsau. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no, 10, Oct., p. 1471-1474.

Room temperature tests gave a value of 0.488 to 0.499 for Al and 0.416 to 0.493 for Cu. Graphs, table. 3 ref.

3816* A Crystallographic Analysis of the Ductile-Brittle Transition in Body-Centered Cubic Single Crystals. A. J. Opinsky. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1650-1651.

Laws of critical normal stress for cleavage and critical shear stress for slip explain orientation and temperature dependence of transition in metals. Diagrams. 3 ref.

3817* After-Effects in Polycrystalline Cadmium. Charles S. Barrett. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1652-1654.

Torsional after-effect is interrupted by an abnormal twisting when film on wire is removed by etching. This is accounted for by pile-up dislocations beneath film during original twisting and relief of residual stresses by elastic and plastic processes during etching. Graph. 8 ref.

3818* Torsional After-Effect Measurement and Applications to Aluminum. C. S. Barrett, P. M. Aziz, and I. Markson. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1655-1661.

Abnormal after-effect in twisted wires that occurs when untwisting is interrupted by etching can be brought under control and used to study mechanical properties of thin surface films and how they are affected by reagents and heat treatment. Results are given of studies of oxide films on high purity Al. Graphs, diagrams. 4 ref.

3819* Thermoelectric Force of Alloys. (French.) J. Friedel. *Journal de physique et le radium*, v. 14, no. 11, Nov. 1953, p. 561-565.

Proposes application of Mott's calculation for determining electrical resistance changes caused by polyvalent substitution impurities in monovalent metals. Calculation are applied to Cu and Au base alloys. Tables, graphs. 20 ref.

3820* The Determination of Optical Constants of Solid Metals Made by Means of Thick Plate. (French.) D. Male and P. Rouard. *Journal de physique et le radium*, v. 14, no. 11, Nov. 1953, p. 584-587.

Reports investigations showing that differences obtained with respect to optical constants from vapor-deposited layers and solid metals are due to differences in structure rather than quality of method. Tables. 12 ref.

3821 Creep Test in Inert Atmospheres. A. J. Fenner and G. Willoughby. *Journal of Scientific Instruments*, v. 30, Nov. 1953, p. 406-407.

Describes construction and operation of apparatus using rhomb and mirror extensometers of the kind widely used for high sensitivity creep tests in air. Diagram, photograph.

3822* Defects of Surface and Quality of Steel Wire. (Hungarian.) Lajos Mankher. *Kohaszati Lapok*, v. 8, no. 11, Nov. 1953, p. 225-239.

Discusses conditions to be fulfilled by basic material as well as mechanical and technological properties of drawn wire resulting from structural changes taking place during processing. Photographs, micrographs.

3823 Brinell Hardness Numbers for Various Loads. *Materials & Methods*, v. 38, Dec. 1953, p. 145.

Presents data sheet reprinted from "Indentation Hardness Testing," Vincent E. Laysaght, Reinhold Publishing Corp., 1949.

3824* Alloy Steels. A Survey Given at the 4th International Mechanical Engineering Congress, June 5th, 1952. (English.) Helmar Nathorst. *Metalen*, v. 8, no. 20, Oct. 31, 1953, p. 363-367.

Discusses yield point and elastic limit of austenitic stainless steels and effect upon machinability. Graphs, micrographs. 21 ref.

3825* Fatigue Tests on Steel Softened by Cold Straining (Italian.) L. Matteoli and B. Andreini. *Metallurgia italiana*, v. 45, no. 9, Sept. 1953, p. 328-337.

Heat treated steels possess a noticeable degree of hardness even at slight cold deformation. Hypotheses advanced are discussed so as to clarify causes of the phenomenon. Graphs, tables. 11 ref.

3826 A Progress Report on Brass. D. C. Bradley and W. R. Toeplitz. *Metal Powder Association, Proceedings*, 1953, p. 69-76; disc., p. 76-77. (TN695 M56p)

Discusses mechanical properties of pure Fe and various Cu alloys. Describes precautions necessary for production of satisfactory parts. Photographs, graphs.

3827 Alloy Powders by the Hydride Process. B. A. Gruber. *Metal Powder Association, Proceedings*, 1953, p. 95-99; disc., p. 99-101. (TN695 M56p)

Mechanical properties of Cr-Ni alloy steels made from powders are described. Tables, graphs.

3828 Metallurgy. II. Fatigue Properties of Steels. J. Clayton-Cave and E. Ineson. *Metal Treatment and Drop Forging*, v. 20, Nov. 1953, p. 553-556.

Describe research program and facilities of the BISRA. Photographs, diagrams.

3829 Metallurgy. III. Researches on Pure Metals. Strain Ageing and Permeability of Silicon Iron Sheet. G. M. Leak, A. M. Sage, and E. Ineson. *Metal Treatment and Drop Forging*, v. 20, Nov. 1953, p. 557-559, 562.

Studies were made on very pure iron and closely controlled alloys to find answers to commercial problems. Photographs, table, graph.

3830* Some Facts About Superconductivity. (English.) C. J. Gorter. *Physica*, v. 19, no. 9, Sept. 1953, p. 745-752; disc., p. 752-754.

Discusses various problems of superconductivity. Graphs. 27 ref.

3831* Superconductivity and Lattice Vibrations. (English.) H. Fröhlich. *Physica*, v. 19, no. 9, Sept. 1953, p. 755-761; disc., p. 761-764.

Theory of isotope effect suggests that in superconductors, coupling between electrons and lattice displacements is stronger than in normal metals. 9 ref.

3832* The Coherence Concept in Superconductivity. (English.) A. B. Pippard. *Physica*, v. 19, no. 9, Sept. 1953, p. 765-772; disc., p. 772-774.

Discusses coherence as a fundamental property of a superconductor. Suggests way in which it may influence electrodynamical behavior, leading to modifications of the London theory. 15 ref.

3833* Thermal Conductivity of Superconductors. (English.) K. Mendelssohn. *Physica*, v. 19, no. 9, Sept. 1953, p. 775-785; disc., p. 785-787.

Reviews present available information with emphasis on recent experimental findings. Graphs. 24 ref.

Metals—Mechanical and Physical Properties

3834* The De Haas-Van Alphen Effect. (English.) D. Shoenberg. *Physica*, v. 19, no. 9, Sept. 1953, p. 791-806.

Surveys information obtained from comparison between experimental results and theory of magnetic susceptibility. Describes new experiments at high fields. Table, oscillographs. 9 ref.

3835* Thermoelectricity at Low Temperatures. (English.) G. Borelius. *Physica*, v. 19, no. 9, Sept. 1953, p. 807-814; disc., p. 814-815.

Several investigations have been made on thermoelectric, resistometric, and magnetic properties of various metals and alloys. Graphs. 20 ref.

3836* Anomalous Properties of Dilute Alloys. (English.) J. Korringa. *Physica*, v. 19, no. 9, Sept. 1953, p. 816-819; disc., p. 820.

Influence of small amounts of Mn on electrical resistivity of noble metals was shown to be governed by interaction between conduction electrons. Graphs.

3837* Thermoelectric Power in Metals at Low Temperatures and Anomalous Impurity Scattering. (English.) D. K. C. MacDonald. *Physica*, v. 19, no. 9, Sept. 1953, p. 841-845.

Marked deviations from theoretical predictions were found by experiments with thermoelectric power of alkali metals from 90 K to liquid He temperatures. Graphs. 6 ref.

3838 A Method of Estimating Impurity Concentrations in Germanium. F. W. G. Rose and E. W. Timmins. *Physical Society, Proceedings*, v. 66, no. 407B, Nov. 1953, p. 984-986.

Resistivity of single samples of Ge has been measured in temperature range $T = 100$-400 K using both d.c. and a.c. (3kc/s) methods. Graphs. 5 ref.

3839 How Tough Are Nickel and Chromium Electroplates for Aluminum? Henry Paige, J. H. James, and F. S. Williams. *Product Engineering*, v. 24, Dec. 1953, p. 162-167.

Value of Ni and Cr electroplated high strength Al has been revealed in a series of corrosion and mechanical strength studies. Tables, graphs, photographs.

3840* Comparative Study of the Wear of Materials Subjected to Friction. (French.) R. de Fleury. *Revue de l'Aluminium*, v. 30, no. 203, Oct. 1953, p. 341-345.

Endurance criterion of materials submitted to friction is the work that the material can elastically absorb per unit vol. Diagram. 6 ref.

3841* The Study of Foundry Alloy A-Z5G. (French.) Louis Grand. *Revue de l'Aluminium*, v. 30, no. 204, Nov. 1953, p. 385-390.

Describes mechanical properties, workability, and corrosion resistance. Tables, graphs, photographs.

3842* Rotating Bending Tests on Specimens of Medium Size. (French.) P. Coron. *Revue de métallurgie*, v. 50, no. 11, Nov. 1953, p. 761-767.

Describes a machine designed to carry out tests to compare cracks of forged and machined crankshafts and to examine effect of metallic coatings on behavior of axles in service. Diagrams, micrographs. 32 ref.

3843 Effects of Alternating Strain on the Structure of Metal. W. A. Wood and R. B. Davies. *Royal Society, Proceedings*, v. 220, ser. A, Nov. 10, 1953, p. 255-266 + 3 plates.

Effects on crystalline structure of successive undirectional tensile strains are compared with effects of the same strains applied alternately in tension and compression. Graphs, diffraction patterns. 8 ref.

3844* Finite Plane Strain. J. E. Adkins, A. E. Green, and R. T. Shield. *Royal Society of London, Philosophical Transaction*, v. 246, ser. A, no. 910, Oct. 29, 1953, p. 181-213.

Develops general theory of plane strain, valid for large elastic deformations of isotopic materials. 22 ref.

3845* Problems of Standardizing Hardness Testing. (German.) E. Kruse. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 10, Oct. 1953, p. 295-299.

Discusses definitions of terms, testing methods, equipment, and correlation between hardness and other properties. Graph.

3846* Creep Strength and Embrittling of Ferritic Steels at 550 C. (German.) E. Theis. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 19, no. 10, Oct. 1953, p. 300-315.

Describes testing procedure and results for determining effects of composition and heat treatment on creep strength of 15 steels. Photographs, tables, diagrams, graphs.

3847 A Comparison Between the Swift Cupping Press and the Tensile Test for the Assessment of the Aluminium-Magnesium Series of Alloys for Deep Drawing and Pressing. Roger Pearce. *Sheet Metal Industries*, v. 30, no. 320, Dec. 1953, p. 1077-1080.

Present investigation was to examine all commercial Al-Mg alloys in all their conditions, to discover which is best to use for mass-production press work. Tables, photograph, diagram.

3848* The Preparation and Investigation of Pure and Intentionally Contaminated Iron. (German.) Johan D. Fast. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1484-1496.

Describes effects of various impurities on strain aging, blue brittleness, and grain boundary brittleness. Diagrams, photographs, tables, graphs. 39 ref.

3849* The Development of Heat Resisting Steels Showing High Strength at Elevated Temperatures. (German.) Karl Bungardt. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1496-1503.

Discusses factors effecting creep behavior and corrosion resistance of steels. Tables, graphs. 13 ref.

3850* Phenomena Encountered in Stressing Materials by Fatigue. (German.) Max Hempel and Eduard Houdremont. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1503-1511.

Discusses determination of reliable bases for calculating behavior of materials under different stress conditions. Reports changes in structure of soft steel after cold deformation and alternate stressing. Graphs, micrographs, diagrams. 11 ref.

3851 Steel Below Zero. O. A. Battista. *Steelways*, v. 9, Dec. 1953, p. 28-31.

Reports studies in effects of low temperatures on steels. Photographs, diagram.

3852 A Study of Elastic and Plastic Stress Concentration Factors Due to Notches and Fillets in Flat Plates. Herbert F. Hardrath and Lachlan Ohman. *U. S. National Advisory Committee for Aeronautics, Report* 1117, 1953, 10 p. (TL521 Un3r)

Six large 24S-T3 Al-alloy-sheet specimens containing various notches or fillets were tested in tension to determine their stress concentration factors in both elastic and plastic ranges. Diagrams, graphs, table. 12 ref.

3853 Application of Silver Chloride in Investigations of Elasto-Plastic States of Stress. L. E. Goodman and J. G. Sutherland. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3043, Nov. 1953, 55 p. (TL570 Un3t)

Quantitative relationships between state of elastic or plastic stress in a specimen and observed relative retardation and extinction angle were developed from a general theory of stress birefringence. Micrographs, graphs, tables. 22 ref.

3854* Investigation of Wear of Piston Rings. (Russian.) R. V. Kugel. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 32-36.

Discusses problem of a more rational chrome plating of oil rings. Diagrams, tables. 5 ref.

3855 Behavior of Carbon and Low-Alloy Steels Between —20 and 650°F. G. H. Enzian. *Welding Journal*, v. 32, Dec. 1953, p. 605s-618s.

Demonstrates that certain pressure vessel steels may be sus-

ceptible to phenomenon of brittleness in these temperature ranges. Appropriate precautions to be observed in critical applications are discussed. Graphs, tables. 59 ref.

3856* Improving the Plastic Compression Test by Forced Glide Friction. (German.) Ernst Mönch. *Zeitschrift für angewandte Physik*, v. 5, no. 10, Oct. 1953, p. 363-369.

Proposes a new method used for celluloid, but also applied to Al. Purpose of experiments, experimental arrangement, preparation of specimens, and results are described. Photographs, micrographs, graphs, 5 ref.

3857* The Laws of Plastic Deformation of Metals Under a Multiaxial State of Tension. I. Theoretical Basis. (German.) Werner Sautter, Albert Kochendörfer, and Ulrich Dehlinger. *Zeitschrift für Metallkunde*, v. 44, no. 10, Oct. 1953, p. 442-449.

Reports on experimental investigations on combined tension and torsion tests of Al tubes and on their theoretical interpretation on the basis of known plasticity theories. Graphs. 30 ref.

3858* Transition of Heat by Means of Free Convection in Metal Melts. (German.) Hans Klein. *Zeitschrift für Metallkunde*, v. 44, no. 10, Oct. 1953, p. 450-456.

Reviews existing data. Compares them with practical results on Zn. Uusual differential formula of heat conduction is evaluated critically. Tables, graphs. 18 ref.

3859* Anisotropy of the Absolute Thermoelectric Voltage of Tin Between 0 and 280 C. (German.) Frauke Cirkler. *Zeitschrift für Naturforschung*, v. 8a, no. 10, Oct. 1953, p. 646-659.

Reports calculations on eight extremely pure monocrystal rods. Production of specimens and experimental arrangement are described. Results are compared with theoretical data of various authors. Tables, graphs. 21 ref.

3860* The Effect of Capacitatively Arranged Boundary Fields Upon the Conductivity of Thin Semiconductor Layers. (German.) K. Zückler. *Zeitschrift für Physik*, v. 136, no. 1, 1953, p. 40-51.

Reports on measurements on thin Se and CuO_2 layers at room temperature and at −78 and +80 C. Results are used as a basis for a new method for determining density of holes and mobility. Applicability of method is outlined. Graphs. 9 ref.

Books and Miscellaneous Publications

3861 Dislocations and Plastic Flow in Crystals. A. H. Cottrell. 223 p. 1953. Oxford Univ. Press, London E. C. 4 (QD931 C82d)

Includes chapters on interpretation of slip in crystals; elastic properties of dislocations; dislocations in crystals; theories of yield strength; and work hardening, annealing, and creep.

3862 Symposium on Strength and Ductility Metals at Elevated Temperatures. ASTM Special Technical Publication no. 128. 249 p. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Particular reference is made to effects of notches and metallurgical changes. Individual papers are separately abstracted.

3863 A Survey of Embrittlement and Notch Sensitivity of Heat Resisting Steels. George Sachs and W. F. Brown. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128. p. 6-20; disc., p. 21-24. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Presents results of a series of experiments. An attempt is made to determine general effects of important variables; to show relationship of phenomena observed; and to suggest a mechanism for embrittlement. Graphs, table. 23 ref.

3864 Influence of Sharp Notches on the Stress-Rupture Characteristic of Several Heat-Resisting Alloys. W. F. Brown, Jr., M. H. Jones, and D. P. Newman. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128. p. 25-45; disc., p. 46-48. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Stress rupture tests were carried out on a number of low-alloy steels, ferritic stainless steels, and austenitic alloys. Unnotched and sharply notched bars were tested at various temperatures. Ductilities were determined. Graphs, micrographs. 9 ref.

3865 Effect of a Notch and of Hardness on the Rupture Strength of "Discaloy". F. C. Hull, E. K. Hann, and H. Scott. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128. p. 49-58; disc., p. 58. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Creep-rupture and notched bar rupture tests were conducted at 1000 and 1200 F. Plain bar rupture strength reached a maximum at a hardener content producing 2% rupture strain. Notched bar strength exceeded plain bar strength in material in which creep specimen had more than 5% rupture strain. Diagrams, graphs, tables.

3866 Notch Rupture Tests of Inconel X and Nimonic 80A. D. E. Furman and A. M. Talbot. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TELMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128. p. 59-65. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Tests were made at 1100, 1350, and 1500 F on Inconel X and at the two latter temperatures on Nimonic 80 A. Both materials were found to be insensitive to shallow, sharp notches at 1350 F, suggesting that accidental surface imperfections would have small effect on service life of these alloys. Tables, graphs, 3 ref.

3867 Effect of Notch Geometry on Rupture Strength at Elevated Temperatures. E. A. Davis and M. J. Manjoine. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128, p. 67-87; disc., p. 88-92. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Three series of creep-rupture tests of notch bars with varying geometry of the notch were performed at elevated temperatures on several heat-resistant alloys. Effect on notch sensitivity of stress level, grain size, hardness, ductility, and heat treatment were investigated. Table, graph, micrograph. 9 ref.

3868 Investigations Into the Influence of Notches on Creep Strength at High Temperatures. W. Siefried. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128, p. 93-130. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Investigations were carried out principally on austenitic steels as used in construction of stationary gas turbines. Table, graphs, photographs, micrographs. 5 ref.

3869 The Effect of Grain Size Upon the Fatigue Properties at 80°, 1200°, and 1600°F of "Precision Cast" Alloy X-40. P. R. Toolin. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128, p. 142-159; disc., p. 160-162. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Notch sensitivity of carefully ground notches was greater at 1200 F than at either room temperature or 1600 F. Machined notches have higher fatigue strengths at room temperature and 1200 F than carefully ground notches. Some tensile strengths are also reported. Tables, graphs, micrographs. 17 ref.

3870 Recovery and Creep in an Alloy Steel. H. A. Lequear and J. D. Lubahn. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPE7RATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128. p. 163-178; disc., p. 180-183. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

Interrupted creep tests demonstrated recovery in Cr-Mo-V steel at 1000 F but not at 800 F. Diagrams, graphs, photographs, table. 6 ref.

Metals—Mechanical and Physical Properties

3871 An Experimental Study of the Strength and Ductility of Steel at Elevated Temperatures. J. Glen. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128, p. 184-221; disc., p. 222-224. 1952. American Society for Testing Materials, Philadelphia. (TS460 Am35st)

Tests explain many effects of alloying elements on creep resistance and ductility of steels under various conditions. It was concluded that the factor largely determining such effects was precipitation. Graphs, tables. 14 ref.

3872 Effect of Sigma on Strength and Ductility of 25 Cr, 20 Ni Steel. G. V. Smith and E. J. Dulis. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128, p. 225-235; disc., p. 236. 1952. American Society for Testing Materials, Philadelphia. (TS460 Am35st)

Sigma causes moderate strengthening at room temperature, severe loss in toughness even at temperatures as high as 500 F, and moderate loss of creep-rupture strength at 1300 F. Tables, graphs, micrographs.

3873 The Structure and Properties of Stainless Steels After Exposure at Elevated Temperatures. A. B. Wilder and E. F. Ketterer. Paper from SYMPOSIUM ON STRENGTH AND DUCTILITY OF METALS AT ELEVATED TEMPERATURES. ASTM SPECIAL TECHNICAL PUBLICATION no. 128, p. 237-246; disc., p. 247-249. 1952. American Society for Testing Materials, Philadelphia. (TA460 Am35st)

A number of ferritic and austinitic stainless steels were exposed at temperatures of 900 to 1200 F for periods up to 34,000 hr. Microstructure of the weld heat-effected zone and parent metal and tensile and creep rupture properties of the parent metal are discussed. Diagram, tables, graphs, micrographs. 4 ref.

See also:
3115 (properties of thin Al films)
3145 (electro acoustic method for measuring thermoelasticity)
3159 (electroconductivity of Cu, Pt, and W)
3625 (properties of Al alloys)
3644 (mechanical and physical properties of high temperature metals)
3773 (thermal conductivity of Mg)
3774 (mechanical properties of low-alloy steel)
3927 (properties of Mo-Ge compounds)
3942 (properties of CrN and ferrochromium)
4232 (notch sensitivity of welds)

METALS—MECHANICAL WORKING

3874 Bending Structural Sections. K. Gunn and D. F. Michell. *Aircraft Production*, v. 15, Dec. 1953, p. 444-450.

A review of various techniques for forming high-strength Al-alloys. Photographs, graphs. 4 ref.

3875* Thread-Rolling. New Attachment for Use on Standard Production-Type Machines. *Aircraft Production*, v. 15, Dec. 1953, p. 482.

Describes Rollrite self-opening thread-rolling die-head, designed for use on machines such as capstan- and turret-lathes and drilling-machines. Photograph.

3876 Die Life Is Up 18 Times With Ductile-Iron Dies. J. C. Neemes, Jr. *American Machinist*, v. 97, Dec. 7, 1953, p. 134-135.

Discusses composition, applications, and advantages of ductile iron dies for operations on brass cartridge cases.

3877 An Evaluation of Spinning vs. Drawing Relates the Methods. J. Lengbridge. *Canadian Metals*, v. 16, Nov. 1953, p. 36, 38, 40.

An evaluation of spinning and drawing shows they can compete as well as supplement each other according to economics involved in individual cases. Diagrams.

3878* Mechanism of the Formation of the Arrest Reported During the Cutting of Metals. (French.) Paul Bastien and Michel Weisz. *Comptes rendus*, v. 237, no. 16, Oct. 19, 1953, p. 871-873.

Reports on investigation of low alloy steel. Causes for phenomenon are indicated and interpreted. Graph, micrograph.

3879* Conditions of Stability of the Built-Up Edge in Phenomena of Metal Cutting. (French.) Paul Bastien and Michel Weisz. *Comptes rendus*, v. 237, no. 17, Oct. 28, 1953, p. 968-970.

Studies stability as a function of cutting temperature and resulting effect on surface finish. Graphs, micrographs.

3880* The Phenomenon of Spontaneous Appearance of Facets on Wires of Polycrystalline Metals During Stretching. (Russian.) P. D. Novokreshchenov. *Doklady Akademii Nauk SSSR*, v. 91, no. 1, July 1953, p. 123-124.

Discusses importance in wire drawing especially at temperatures near recrystallization point. Table, graph.

3881* Influence of Water and Alcohol on the Grinding of Metals. (Russian.) V. D. Kuznetsov and V. D. Taranenko. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 49-52.

Results of author's experiments with abrasive grinding of Al, Cu, and Zn in air, water, and ethyl alcohol do not agree with results of other investigations. Tables, diagram. 2 ref.

3882 Continuous Production of Improved Gautier Rail Anchors at Mid-West Forging & Manufacturing Co. *Industrial Heating*, v. 20, Nov. 1953, p. 2174, 2176, 2178, 2180, 2330.

Describes forming and heat treating operations. Photographs, diagrams.

3883 Continuous Automatic Processing Line for Beryllium Coils and Rods Placed in Operation. *Industrial Heating*, v. 20, Nov. 1953, p. 2188.

A new design continuous processing line for Be coils and rods has just been completed and started into production at the plant of Beryllium Corp. of America, Reading, Pa. Photographs.

3884 The Computation of Loads in Metal Strip Rolling by Methods Involving the Use of Dimensional Analysis. Maurice Cook and R. J. Parker. *Institute of Metals, Journal*, v. 82, Nov. 1953, p. 129-140.

Calculated load values were found to be in good agreement with measured results for conditions where ratio of initial strip thickness to roll diameter was greater than about 1 : 200. When ratio was less than this value computed data were not so accurate. Graphs, diagrams, tables. 11 ref.

3885 Pressure: Versatile Equipment Broadens Work Range. John E. Hyler. *Iron Age*, v. 172, Dec. 3, 1953, p. 168-171.

Describes hydraulic presses which handle a wide variety of assembly jobs by fitting, crimping, riveting, staking, and other pressure methods. Photographs.

3886 Forged Tools. *Iron & Steel*, v. 26, Dec. 1953, p. 545-550.

Describes rolling mills, forges, and heat treating facilities for making forks, shovels, and axes. Photographs, diagrams.

3887 Flying Shears for Billet, Bar and Rod Mills. J. H. Hitchcock and E. S. Murrah. *Iron and Steel Engineer*, v. 30, Nov. 1953, p. 80-87; disc., p. 87-90.

Describes types, operation, and performance. Photographs, graphs. 5 ref.

3888 Low Frequency Induction Coils Shorten Billet Heating Time. *Iron and Steel Engineer*, v. 30, Nov. 1953, p. 130, 132.

Describes experimental furnace and its operation. Photographs.

3889 Blooming Mill Built for Detroit Steel. *Iron and Steel Engineer*, v. 30, Nov. 1953, p. 140, 144, 146, 150.

Describes two-high, reversing, high lift 44 x 110-in. slab blooming mill. Photographs.

3890 Pass Design and Rolling of Automotive Rim Sections. Howard H. Morgan. *Iron and Steel Engineer*, v. 30, Dec. 1953, p. 55-60; disc., p. 60, 61.

Discusses techniques and equipment employed in continuous rolling of intricate shapes requiring exacting tolerances. Diagrams, table.

3891 A Modern Automatic Fuel Shut-Off System for Soaking Pits. A. L. Lancaster. *Iron and Steel Engineer*, v. 30, Dec. 1953, p. 69-76; disc., p. 76.

States that position of furnace covers or doors controls firing conditions in furnace pits. Photograph, diagrams.

3892 Speed Regulation for Tandem Tube Mill Drives. F. H. Wickline. *Iron and Steel Engineer*, v. 30, Dec. 1953, p. 84-86.

Successful applications of electronic controls in the steel industry are reported. Photograph, diagrams, graphs.

3893 The Story of Wire. Rodman R. Tatnall. *Iron and Steel Engineer*, v. 30, Dec. 1953, p. 129-134.

Describes equipment and techniques employed in wire processing. Presents brief outline of its applications. Diagrams, photographs.

3894* Formability of Structural Low Alloy Steel at High Temperatures. (Russian.) S. I. Gubkin, V. G. Osipov, and A. N. Danil'chenko. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 6, June, p. 910-917.

Positive formability was determined in range of 20 to 1300 C. Optimal temperature zone for forging and rolling lies in 900-1200 C range. As deforming volume increases at 800 C, deformation resistance decreases. Graphs, micrographs. 6 ref.

3895* Investigation of the Nature of Deformation During Free Upsetting and Upsetting in Forms. (Russian.) L. N. Moguchii. *Izvestiia Akademii Nauk SSSR, Otdelenie, Tekhnicheskikh Nauk*, 1953, no. 10, Oct., p. 1475-1479 + 1 plate.

Forms were found to increase the nonuniformity of deformation and to decrease plasticity of the forging. Deformability was increased if negative hydrostatic stress was developed in the blank. Table, graph, photographs. 3 ref.

3896* Development Trends in Forging Technique. I. Heavy Forging by Hammers and Presses. (Swedish.) J. M. Schenström. **II. Drop Forging.** Bengt Lagercrantz. *Jernkontorets Annaler*, v. 137, no. 9, 1953, p. 455-611; disc., p. 612-616.

Discusses theory of plastic deformation under pressure. Describes operations, equipment, and tools. Tables, graphs, diagrams, photographs. 105 ref.

3897* Steel Conditioning With the Oxyacetylene Method. (Swedish.) Gösta Kihlgren. *Jernkontorets Annaler*, v. 137, no. 9, 1953, p. 617-700; disc., p. 700-701.

Describes hand scarfing of billets with oxyacetylene flame and powder scarfing method for high alloy steels. Tables, graphs, diagrams.

3898* The Critical Rake Angle Method of Evaluating Cutting Fluids. W. E. Lauterbach and E. A. Ratzel. *Lubrication Engineering*, v. 9, Dec. 1953, p. 313-315.

Presents results of experimental studies conducted to show applications and limitations of this method. Tables, graphs, photographs.

3899* Machining—Theory and Practice. K. G. Lewis and W. Milne. *Machinery*, v. 83, Nov. 20, 1953, p. 1007-1013.

Discusses machinability, tool life, types of tool failure, and work handling. Graphs, tables. 24 ref.

3900* Producing Tubing Assemblies for Airplane Engines. *Machinery*, v. 60, Dec. 1953, p. 175-179.

Includes photographs.

3901* When and How to Use Carbides in Machining Stainless Steel. G. J. Stevens. *Machinery*, v. 60, Dec. 1953, p. 196-200.

Includes diagrams.

3902 Finish Rolling Cast Iron Guiding Surfaces for Machine Tools. W. Iwascheff. *Machinery (London)*, v. 83, Nov. 27, 1953, p. 1058-1060.

Describes technique, applications, and advantages of finishing previously machined cast-iron guideways or bearing surfaces by pressure rolling. Photographs, graphs, table.

3903 Versatile Hot Rod Mill. *Metal Industry*, v. 83, Nov. 20, 1953, p. 417-419.

Describes installation designed to roll wide variety of alloys. Photographs, diagrams.

3904 Work Hardening of Metals. *Metal Industry*, v. 83, Nov. 27, 1953, p. 446.

Discusses slip and theories of cold work hardening. 3 ref.

3905 The Corrosive Properties of Soluble Cutting Oils. Effect on Machine Tool Cast Irons. *Metallurgia*, v. 48, no. 289, Nov. 1953, p. 233-240.

Studies were made of influence of cutting oils on efficiency of machining operations. Photographs, tables, graphs.

3906 Hot Rolling of Steel Strip. Planetary Mill Installed at Willenhall. *Metallurgia*, v. 48, no. 289, Nov. 1953, p. 247-248.

Describes equipment, plant layout, and operating procedures. Diagrams, photographs.

3907* Machinability of Stainless Steel. (French.) Jean Daurat. *Métallurgie et la construction mecanique*, v. 85, no. 11, Nov. 1953, p. 885, 887.

Discusses lubrication during machining. Types of lubricating oils, temperature of cooling oils, cleaning of pieces, cleanliness of the lubricant, and importance of spraying apparatus. Diagrams.

3908 Mechanical Working. I. Co-Operative Research in Metal Working. W. C. F. Hessenberg. **II. Roll Force Measurement and Automatic Gauge Control.** W. C. F. Hessenberg. **III. The Study of High-Speed Wire Drawing. Problems of Heat Lubrication.** J. G. Wistreich. **IV. Some Aspects of Theoretical Plasticity.** A. P. Green. **V. Forging Research. Use of Plasticine Models.** P. M. Cook. *Metal Treatment and Drop Forging*, v. 20, Nov. 1953, p. 525-550.

Describes developments in research conducted by the BISRA. Graphs, diagrams, photographs. 26 ref.

3909* The "Aptitude to Swaging" of Sheet Metal. I. A New Swaging Test. The "P. V. I." Test. Its Relation With the Rational Traction Test. (French.) Pierre Vauthier. *Métaux, Corrosion-Industries*, v. 28, no. 339, Nov. 1953, p. 437-459.

Includes tables, graphs, diagrams.

3910* The Problem of Dry Friction in Chip Forming Machining. E. Bickel. *Microtecnic (English Ed.)*, v. 7, no. 5, 1953, p. 243-245.

Discusses causes of wear including plastic deformation, brittle fracture, and wear produced by chip sliding along face of cutting edge. 9 ref.

3911* Hydro-Press High-Pressure Cylinder Development. Don R. Maynard. *Modern Machine Shop*, v. 26, Dec. 1953, p. 152-154, 156, 158, 160.

Describes cylindrical containers for high-pressure rubber forming tools. Photographs, diagrams.

3912* Hot Forming Titanium. *Modern Metals*, v. 9, Nov. 1953, p. 88, 90.

Describes methods of press forming Ti sheet. Photographs.

3913 The Rolling of Metals and Alloys. I. Historical Development of the Rolling Mill. Eustace C. Larke. *Sheet Metal Industries*, v. 30, no. 320, Dec. 1953, p. 1081-1091.

Includes graphs, diagrams, photographs. 33 ref. (To be continued.)

3914* The Determination of Rolling Time for Different Steel Grades as a Basis for Reference Ton Accounting in the Rolling Mill by Means of an Automatic Recording Instru-

Metals—Mechanical Working

ment. (German.) Friedrich Bleimann. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1468-1472.

Describes use for compilation of steel grades according to rolling difficulties. Photographs, tables, graphs.

3915 What About Your Safety Program? Harry Chandler. *Steel*, v. 133, Nov. 30, 1953, p. 101-104.

Describes safety equipment and procedures in a stamping plant. Photographs.

3916 Bar Mill Built to Serve Market. Allen G. Gray. *Steel*, v. 133, Dec. 7, 1953, p. 196-197, 199.

Describes a mill for cold drawing of bars. Photographs, plant layout, diagram.

3917 Coating Paves Way for Drawing Speedup. *Steel* v. 133, Dec. 21, 1953, p. 82-83.

By replacing conventional lime coating practice with a dry, thin-film lubricant, one plant tripled production with 3-die draw benches. Photographs, tables.

3918 German Research in Drop Forging. Otto Kienzle. *Steel Processing*, v. 39, Nov. 1953, p. 563-568.

Discusses equipment, tolerances, and wear. Photographs, diagrams, graphs.

3919 Steam-Hydraulic vs. Hydraulic Forging Press. Victor Tatarinov. *Steel Processing*, v. 39, Nov. 1953, p. 581.

Compares efficiency of two 600-ton presses.

3920 Forging Capacity of Hammers. K. Lange. *Steel Processing*, v. 39, Nov. 1953, p. 594-596.

Describes experiments to determine accuracy with which forging capacity of hammers can be estimated by upsetting of Pb cylinders. Graphs, photograph.

3921* How to Get the Most From Carbide Tools. Edward J. Novack. *Tool Engineer*, v. 31, Dec. 1953, p. 37-43.

Discusses selection, design, performance, maintenance, and inspection of tools. Diagrams, photographs.

3922* Finish Rolling Improves Cast Iron Ways. Wackch Iwascheff. *Tool Engineer*, v. 31, Dec. 1953, p. 57-59.

Describes tools and procedures for cold rolling cast iron machine tool ways. Diagram, micrograph, table.

3923* Magnesium Forming. II. Hot Drop Hammer Forming and Sheet Stretching. Francis L. Coenen. *Tool Engineer*, v. 31, Dec. 1953, p. 62-68.

Describes die design and operating procedures. Diagram, photographs, table.

3924* Machining Stainless Steels. *Tool Engineer*, v. 31, Dec. 1953, p. 81-84.

Discusses tools and machining speeds for less machinable grades. Tables.

3925* Theoretical Equation of the Cutting Force. (Russian.) A. M. Rozenberg and A. N. Eremin. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 55-59.

Experimental testing was carried out on several steels. Graphs. 6 ref.

3926* Reproducibility and Productivity of Electrospark Machining. (Russian.) S. A. Kipnis. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 59-66.

A theoretical study was made of relationship of wear in the instrument and corresponding wear of the processed part. Tables, diagrams. 7 ref.

See also:

3160 (electrical heating used in metal drawing)
3248 (drawing press controls)
3688 (flakes in steel forgings)
3767 (integrating heat treating and machining operation)
3822 (defects in drawn steel wire)
3824 (machinability of stainless steels)
3841 (workability of foundry alloy A-Z5G)

METALS—METALLOGRAPHY, TRANSFORMATIONS, AND STRUCTURES

3927 The Preparation and Properties of Molybdenum-Germanium Compounds. Alan W. Searcy and Robert J. Peavler. *American Chemical Society, Journal*, v. 75, Nov. 20, 1953, p. 5657-5659.

An X-ray diffraction investigation established existence of Mo_3Ge_2, Mo_2Ge_3, α-$MoGe_2$, and β-$MoGe_2$ in addition to Mo_3Ge which has already been reported. Tables. 8 ref.

3928* The Iron-Iron Silicide-Copper Silicide-Copper Constitution Diagram. (German.) Rudolf Vogel and Dietrich Horstmann. *Archiv für das Eisenhüttenwesen*, v. 24, nos. 9-10, Sept.-Oct., 1953, p. 435-440.

Describes thermal and metallographic study of Fe-Si-Co system and determination of lower and upper critical temperature of ternary miscibility gap. Tables, graphs, micrographs.

3929* The Electron Microscope and Its Application to Metallurgy. V. A. Pickles. *Australasian Engineer*, 1953, Oct., p. 61-69.

Includes photographs, diagrams, tables. 45 ref.

3930 Production of Single Crystals of Nickel. R. F. Pearson. *British Journal of Applied Physics*, v. 4, Nov. 1953, p. 342-344.

Detailed account and preparation of faces parallel to desired crystal planes is described. Diagrams, photograph. 3 ref.

3931* Textures of Secondary Recrystallization in Mild Iron. (French.) Roger Guihaumé, Micheline Sternberg, and Paul Lacombe. *Comptes rendus*, v. 237, no. 16, Oct. 19, 1953, p. 904-906.

Reports details of investigations. Crystal orientation is discussed. Differences in a large number of specimens are indicated. 4 ref.

3932* Observation of Polygonization in Uranium by X-Ray Diffraction. (French.) Adrienne R. Weill and Pierre A. Jacquet. *Comptes rendus*, v. 237, no. 17, Oct. 28, 1953, p. 1002-1003.

Methods permit study of grain sub-structure and simultaneous comparison of microscopic and radio-crystallographic examinations. Micrographs. 5 ref.

3933* Electron Diffraction Studies of the Formation of Single Crystals of Aluminum-Copper Alloys by Heating in Vacuum. (French.) Noboru Takahashi and Jean-Jacques Trillat. *Comptes rendus*, v. 237, no. 19, Nov. 16, 1953, p. 1246-1248.

Appearance and transformation of certain phases of Al-Cu alloys to monocrystalline state were studied. Includes Debye-Scherrer diagrams.

3934* "Dew" Method as Applied in the Investigation of Spiral Step Growth. (Russian.) N. V. Gliki. *Doklady Akademii Nauk SSSR*, v. 90, no. 4, June 1, 1953, p. 541-543.

A jet of warm moist air directed against carefully cleaned surface causes small changes in the contours to stand out in relief. Micrographs. 7 ref.

3935* Problem of the Structure of Oxide Forming on Aluminum Surface. (Russian.) M. S. Beletskii. *Doklady Akademii Nauk SSSR*, v. 91 no. 1, July 1, 1953, p. 89-91.

Inter atomic distances of γ-oxide crystals was determined by X-ray structural analysis. Graphs. 4 ref.

3936* Diffusion of Iron Into Nickel. (Russian.) M. B. Neiman, A. Ia. Shiniaev, and B. G. Dzantiev. *Doklady Akademii Nauk SSSR*, v. 91, no. 2, July 11, 1953, p. 265-267.

Studies were made by following a new variant of tracer technique for determining diffusion in solid bodies. Graphs, table. 7 ref.

3937* Basic Types of Constitution Diagrams of Titanium Base Binary Systems. (Russian.) I. I. Kornilov. *Doklady Akademii Nauk SSSR*, v. 91, no. 3, July 21, 1953, p. 549-552.

Position in the periodic system of Ti and its alloying elements and similarity or differences of their chemical properties deter-

mine characteristics of their interactions and consequently the types of phase diagrams. Graphs. 16 ref.

3938* Precipitation of Nickel Tantalide Ni_3 Ta From Alloys of the Nickel-Tantalum Binary System. (Russian.) I. I. Kornilov and E. N. Pylaeva. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 841-843 + 1 plate.

Ni_3 Ta phase was found ot have a hexagonal lattice. Methods of study are described. Micrographs.

3939* Changes on Metal Surfaces Caused by Chemical Processes and Heating. (Russian.) S. Z. Roginskii, I. I. Tretiakov, and A. B. Shekhter. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1167-1169 + 1 plate.

Electron microscopic investigations of surface changes under various conditions detected new characteristics. Micrographs. 7 ref.

3940 A Survey of the Uranium-Nickel System. J. D. Grogan and R. J. Pleasance. **Appendix on an X-Ray Examination of Some Uranium-Nickel Alloys.** Betty E. Williams. *Institute of Metals, Journal*, v. 82, Nov. 1953, p. 141-147.

A liquidus curve was plotted and phase compositions were determined. Phase diagram, tables, micrographs.

3941* Structure of Austenite at High Temperatures. (Russian.) I. A. Oding and M. G. Lozinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 7, July, p. 1035-1043.

Discusses appearance of plane blocks in austenite grains and increased chemical heterogeniety occuring after heating to high temperatures. Diagrams, micrograph. 9 ref.

3942* Structure and Properties of Chromium Nitride and Ferrochromium. (Russian.) M. L. Korolev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 10, Oct., p. 1465-1470.

Chromium-nitrogen alloys were prepared and tested. Hardness of srtuctural components were measured at temperatures up to 1000 C. Tables, graphs, diagram. 8 ref.

3943 The Distibution of Solute in Crystals Grown From the Melt. I. Theoretical. J. A. Burton, R. C. Prim, and W. P. Slichter. **II. Experimental.** J. A. Burton, E. D. Kolb, W. P. Slichter, and J. D. Struthers. *Journal of Chemical Physics*, v. 21, Nov. 1953, p. 1987-1996.

Incorporation of solute elements into single crystals of Ge grown from the melt was examined. Variation of distribution coefficient with conditions of crystallization was studied. Graphs, diagrams, tables. 24 ref.

3944* McQuaid-Ehn Grain Size Determined by Spectrochemical Analysis. G. E. Ressler. *Journal of Metals*, v. 5, Dec. 1953, p. 1622.

Correlates Al determinations with grain size in carburizing and medium carbon grades of killed steel. Table.

3945* Surface Structures on Single Crystals Produced from Melt. F. D. Rosi. *Journal of Metals*, v. 5; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 197, 1953, p. 1661-1662.

Discusses transverse cellular structure and longitudinal striae on crystals produced by Bridgeman method. Micrographs. 8 ref. 8 ref.

3946 Equilibrium Thermochemistry of Solid and Liquid Alloys of Germanium and of Silicon. I. The Solubility of Ge and Si in Elements of Groups III, IV and V. Carl D. Thurmond. **II. The Retrograde Solid Solubilities of Sb in Ge, Cu in Ge, and Cu in Si.** Carl D. Thurmond and J. D. Struthers. *Journal of Physical Chemistry*, v. 57, Nov. 1953, p. 827-834; disc., p. 830, 834-835.

Describes activity and temperature coefficients and solidus and liquidus curves. Graphs. 36 ref.

3947 Segregation of Impurities During the Growth of Germanium and Silicon Crystals. R. N. Hall. *Journal of Physical Chemistry*, v. 57, Nov. 1953, p. 836-839; disc., p. 839.

Segregation of impurities was found to depend upon growth rate and crystal orientaiton as well as upon degree of stirring in the melt. Graphs. 8 ref.

3948 Band Structure in Disordered Alloys and Impurity Semiconductors. Hubert M. James and Arthur S. Ginzbarg. *Journal of Physical Chemistry*, v. 57, Nov. 1953, p. 840-847; disc., p. 847-848.

A mathematical analysis of a one-dimensional model. Graphs. 14 ref.

3949 Heat Treating Temperatures in Relation to the Iron-Carbon Diagram. *Materials & Methods*, v. 38, Dec. 1953, p. 147.

Presents phase diagram from a paper by Edward J. Ocean at the A.G.A. Industrial Gas School, May 1953.

3950* Production of Recrystallization Textures. (French.) P. Coheur. *Métaux, Corrosion-Industries*, v. 28, no. 339, Nov. 1953, p. 423-434.

Discusses properties of metals, factors depending on laminating, and factors characterizing annealing. Diagrams, radiograms, tables. 19 ref.

3951* Orientation of γ-Alumina on the Surface of Melted Alminum. (French.) Shigueo Oketani and Sigemaro Nagakura. *Metaux, Corrosion-Industries*, v. 28, no. 339, Nov. 1953, p. 435-436.

Includes tables, graphs. 3 ref.

3952 Hyperfine Structure of Silver and Gold by the Atomic Beam Magnetic Resonance Method. Günter Wessel and Hin Lew. *Physical Review*, v. 92, ser. 2, Nov. 1, 1953, p. 641-646.

Hyperfine structures of ground states were studied by means of an ionizer of electron bombardment type applied to a beam of atoms in a magnetic resonance apparatus. Diagrams, graphs, tables. 17 ref.

3953 The Zeeman Effect of the Cr Ground State. P. Brix, J. T. Eisinger, H. Lew, and G. Wessel. *Physical Review*, v. 92, ser. 2, Nov. 1, 1953, p. 647-650.

Studies were made using atomic beam magnetic resonance method at magnetic fields up to 850 gauss. Chromium atoms were detected by means of an electron-bombardment type ionizer. Tables, graphs. 14 ref.

3954* The Isothermal Transformation of Austenite and the Distribution of Alloying Elements in Low-Alloy Steel. (French.) Axel Hultgren. *Revue de métallurgie*, v. 50, no. 11, Nov. 1953, p. 737-760.

Various types of transformations have been distinguished and their kinetics determined from time-temperature-transformation diagrams, micro-examination of the transformation products, and diffraction study and chemical analysis of carbides separated by electrolytic means. Tables, graphs, micrographs. (To be continued.)

3955* The Use of Radio-Elements to Study Segregation of Impurities in High-Purity Aluminum Grain Boundaries. (French.) F. Montariol, Ph. Albert, and G. Chaudron. *Revue de métallurgie*, v. 50, no. 11, Nov. 1953, p. 768-774.

Results show that method is valuable when impurities consist of Zn or Ru. Micrographs, table. 4 ref.

3956* Crystal Chemistry of B-Metals. II. Discussion and Investigation of Trigonally Distorted NaCl Structures. (German.) Konrad Schubert and Horst Fricke. *Zeitschrift für Metallkunde*, v. 44, no. 10, Oct. 1953, p. 457-461.

Describes occurrence of trigonally distorted NaCl (B1) systems. Effect of third components upon axial relaitons of SnSb is discussed. Crystal structure of GeTe and Bi_2Se_3 is outlined. Graphs, micrographs, table. 12 ref.

3957* Transposition Reactions in the Iron-Silicon System. (German.) Erich Fitzer. *Zeitschrift für Metallkunde*, v. 44, no. 10, Oct. 1953, p. 462-472.

Describes solid reactions occurring when phases are in contact which do not correspond to thermal equilibrium state. Discusses diffusion of silicon in the α solid solution. Presents concentration dependence of diffusion coefficient and stratification in Fe-FeSi and Fe-Si arrangements. Theoretical findings are applied to practical cases. Diagrams, micrographs, graphs, table, photographs. 26 ref.

Metals—Metallography, Transformations, and Structures

3958* The Dependence of the Solidification Curve Upon Orientation in Cubic, Face-Centered Metal Crystals. (German.) P. Haasen. *Zeitschrift für Physik*, v. 136, no. 1, 1953, p. 26-39.

Theoretical interpretation of previous experimental findings on basis of a specific mutual effect of a displacement in main glide system and displacement in various disturbance systems. Tables, graphs. 33 ref.

See also:
3089 (anodic oxidation of Al)
3850 (changes in structure of soft steels)

METALS—POWDER

3959* The Development of Aluminum Powder Metallurgy. III. (Hungarian.) György Halmos. *Aluminium (Budapest)*, v. 5, no. 8, Aug. 1953, p. 165-175.

Describes experiments in Hungary with Al powder and scrap Al powder. Discusses results of various tests of hardness, heat resistance, cold forming, weldability, machinability, and electric conductivity. Outlines possibilities for application of sintered Al bodies. Photographs, micrographs, tables, graphs, diagrams. 37 ref.

3960 Cermets—Possible Answer to Ultra-High Temperatures. Alexander Pechman. *Finish*, v. 10, Dec. 1953, p. 37-38, 86, 88.

Discusses production and properties of cermets. Describes applications of ceramic protective coatings in aircraft engines. Photograph, table.

3961 Powder Metallurgy at the Cross Roads—Present and Future Possibilities. John D. Shaw and Walter V. Knopp. *Metal Powder Association, Proceedings*, 1953, p. 63-68. (TN695 M56p)

Discusses numerous factors having significant bearing on potentials of powder metallurgy.

3962 Non-Metallic Impregnation of Sinterings. Wilson N. Pratt. *Metal Powder Association, Proceedings*, 1953, p. 78-80; disc., p. 80-82. (TN695 M56p)

Describes important characteristics of synthetic resins for successful impregnation. Photograph, micrographs.

3963 Review of Aluminum Powder Metallurgy. J. B. Haertlein and J. F. Sachse. *Metal Powder Association, Proceedings*, 1953, p. 83-92; disc., p. 92-94. (TN695 M56p)

Discusses Al powder manufacture, two important uses, and art of fabrication. Tables, graph.

3964 Powdered Metals Enter Stainless Stage. W. L. Batten. *Steel*, v. 133, Dec. 21, 1953, p. 78-81.

Describes stainless steel powder production, applications, properties, and outlook. Photograph, diagram, tables.

See also:
3263 (design of powdered Fe core inductances)
3615a (metal powder friction materials)
3826 (fabrication of brass powder parts)
3827 (alloy powders by hydride process)
3927 (preparation of Mo-Ge compounds)

MINING ENGINEERING

3965* Modern Methods and Tools of Rotary Drilling in the Service of Faster Prospecting and Exploiting of Oil. (Hungarian.) Ödön Alliquander. *Bányászati Lapok*, v. 8, no. 11, Nov. 1953, p. 525-534.

Describes design and operation of rotary drills in general. Results achieved in Hungary with various improvements are outlined. Discusses turbo-rotary drilling and rotary-percussion drilling. Photographs, diagrams.

3966* Symposium on Well Logs. *Mines Magazine*, v. 43, Oct. 1953, p. 87-126.

Includes "Some Notes on Well Logs of Various Types With a Resume of Opinions About Them", L. W. Storm; "Current Electric and Radio-Activity Logging Methods", Bob Greider; "Notes on the Guard Electrode Log With Extracts From an Article on Its Use by the Halliburton Company"; "Summary of Creole's Experience With Amplified-Scale Electric Logs", A. L. Payne; "Notes on Subsurface Logging Methods in Eastern Venezuela", E. Sugar; "New Logging Techniques for Reservoir Analysis in Unconsolidated Sands on the Lower Gulf Coast", William E. White, Jr.; "Applications of Radioactivity Logs in the Rocky Mountain Area"; and "Interpretation of Core Analysis", J. G. Crawford.

3967* Prospecting by Radon. (French.) R. Monicard and P. Magneville. *Revue de l'institut francais du petrole et Annales des combusibles liquides*, v. 8, no. 10, Oct. 1953, p. 513-520.

Properties, analysis, and methods of extracting Rn are described. Application was made for revealing contacts between oil field formations. Graphs, diagram. 15 ref.

3968* Mechanism of Sudden Ejections of Coal and Gas. (Russian.) A. V. Varzin. *Ugol*, 1953, no. 9, p. 19-22.

Describes contributing factors. Suggests use of radioactive preparations to counteract them. Diagrams, photograph. 3 ref.

3969* The Connection Between the Structure of Coal Layers and the Phenomenon of Sudden Extrusion of Gasses and Rock. (Russian.) I. L. Ettinger, L. E. Shterenberg, and V. S. Iablokov. *Ugol*, 1953, no. 11, p. 28-31.

Discusses necessity of recognizing structural changes in certain layers and their importance in rock extrusions. Diagrams, tables. 4 ref.

3970* Basic Problems of Health Security Measures in Coal Mining Work. (Russian.) P. T. Prikhod'ko. *Ugol*, 1953, no. 11, p. 31-34.

Describes dust removal measures and special clothing and equipment to protect the worker.

3971* Discussion on Methods of Studying the Process of Shear of Rocks in Mines and Means of Predetermining Its Elements. (Russian.) **VI. On the Precision of Calibrating the Deformation on the Earth's Crust.** N. G. Rusakov. **VII. Method of Studying Mine Rock Displacement.** G. P. Luthtanov. **VIII. The Study and Practical Application of Data Obtained From Investigations of Mine Rock Displacements.** D. N. Aleksandrov. *Ugol*, 1953, no. 11, p. 34-40.

Includes tables, graph. 16 ref.

3972 A Study to Determine Potential Dust Exposure in Connection With Intermittent Rock Drilling in Coal Mines. C. W. Owings and Leslie Johnson. *U. S. Bureau of Mines, Report of Investigations* 5004, Oct. 1953, 7 p. (TN21 Un3r)

Survey of 30 mines shows that rock drilling presents a health hazard from exposure to silica-bearing dust. Suggests wet drilling methods or use of approved dust collectors. Tables, graph. 11 ref.

NONDESTRUCTIVE TESTING

3973* The Resistometer as a Tester of the Protective Layer on Aluminum and Other Metals. (German.) W. Ruff. *Aluminium*, v. 29, no. 11, Nov. 1953, p. 462-464.

Working principle is based on definition of ohmic resistance of film. Graphs, diagrams.

3974 Use of Gamma-Ray Emitters for Industrial Radiography. Herbert R. Isenburger. *American Foundryman*, v. 24, Dec. 1953, p. 46-48.

Describes properties, uses, testing procedures, and safety precautions. Charts, tables.

3975 ASA Will Simplify Surface Roughness Measurements. F. W. Witzke. *Iron Age*, v. 172, Dec. 3, 1953, p. 180-182.

Use of arithmetic average microinch readings for surface roughness measurements are recommended in a proposed revision of American Standard ASA B.46 1953. Diagram, photographs.

3976* Electrographic Spot Testing of Bearing Surfaces. A. E. Roach and A. O. DeHart. *Lubrication Engineering*, v. 9, Dec. 1953, p. 302-306.

Describes simple, rapid, reliable, non-destructive technique. Diagrams, photographs. 5 ref.

3977* The Effect of Mechanical Stresses During Magnetic Induction Testing for Defects of Steel Pipes. (German.) Kurt Matthaes. *Zeitschrift für Metallkunde*, v. 44, no. 10, Oct. 1953, p. 473-474.

Proposes method for suppressing mechanical stresses during such measurements by use of magnetic-mechanical instruments.

NUCLEAR PHYSICS, NUCLEONICS, AND RADIATION

3978* The Outlook for Economic Nuclear Power. B. L. Goodlet. *Atomics (British)*, v. 4, Dec. 1953, p. 311-317.

Problem of economic development and utilization of nuclear energy is discussed. Tables. 6 ref.

3979* Linear Electron Accelerators in Nuclear Research. E. R. Wiblin. *Atomic Scientists Journal*, v. 3, Nov. 1953, p. 77-86.

Discusses principle and performance of traveling wave accelerators, neutron cross-section measurements, and the A.E.R.E. accelerators. Graphs, diagrams. 5 ref.

3980 The Use of Radioactive Isotopes in Metallurgy. R. Shuttleworth. *British Journal of Applied Physics*, v. 4, Nov. 1953, p. 326-329.

Discusses applications in radiography; gaging thickness of foils and coatings; dectecting minute amounts of labelled metals; and measuring self-diffusion coefficients. Tables. 25 ref.

3981 Neutron Capture γ-Rays From Heavy Odd-Charge Nuclei. G. A. Bartholomew and B. B. Kinsey. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1025-1050.

Describes neutron capture γ-ray spectra of As, Cb, Rh, Ag, In, Sb, Pr, Ta, Au, and Tl. Energies and intensities of strongest high energy γ-rays are given for each element. Graphs, tables. 27 ref.

3982 Neutron Capture γ-Rays From Even-Charge Nuclei. B. B. Kinsey and G. A. Bartholomew. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1051-1086.

Neutron capture γ-ray spectra of Se, Sr, Zr, Mo, Cd, Sn, Ba, Sm, Gd, W, Pt, and Hg are described. Graphs, tables. 59 ref.

3983 The Emission Spectrum of Aluminum Monofluoride I. S. M. Naudé and T. J. Hugo. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1106-1114 + 1 plate.

Two band systems of emission spectrum of AlF are described. Tables. 4 ref.

3984 On the Shrinkage Factor of Nuclear Emulsions. L. H. Greenberg and R. N. H. Haslam. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1115-1120.

Shows that shrinkage factor is not a function of angle of inclination of α particle tracks in emulsion. Graphs. 9 ref.

3985 The Decay of Cd^{105}. F. A. Johnson. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1136-1147 + 1 plate.

Isotope Cd^{105} (55 min.) has been produced by Ag^{107} $(p,3n)$ reaction in the McGill University synchrocyclotron and has been investigated by means of a 180° spectrograph of high resolution, a lens spectrometer, and a scintillation spectrometer. Tables, graphs. 17 ref.

3986 Rayleigh Scattering of Condensed Matter. O. Theimer and E. Lell. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1170-1181.

Includes graphs. 9 ref.

3987 Penetration of Radiation Through a Thick Slab of Isotropically Scattering Material. I. Kuscer. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1187-1188.

Includes table. 9 ref.

3988 Design and Use of Ten-Kilocurie Source of Gamma Radiation. L. E. Brownell, W. W. Meinke, J. V. Nehamias, and E. W. Coleman. *Chemical Engineering Progress*, v. 49, Nov. 1953, p. 569-576.

Discusses Co^{60}. Describes shielded container and uses of γ-radiation to sterilize food and pharmaceuticals. Diagrams, graphs, photographs. 11 ref.

3989* Method of Measuring the Activity of Alpha-Emitters by Cine-Nucleography. (French.) Odette Roehrich-Goussu. *Comptes rendus*, v. 237, no. 20, Nov. 16, 1953, p. 1230-1232.

Using nuclear plates, traces of α-rays present in a certain number of fields of the microscope are counted.

3990* The Economic Impact of Atomic Energy on the Electrical Power Industry. E. H. Dixon. *Edison Electric Institute Bulletin*, v. 21, Dec. 1953, p. 455-458.

A general discussion.

3991 The Design of the Electric Field in a Van De Graaff Generator. J. W. Boag. *Institution of Electrical Engineers, Proceedings*, v. 100, pt. 4, no. 5, Oct. 1953, p. 63-82.

Discusses best proportions for high-voltage electrodes. Graphs, diagrams, tables. 16 ref.

3992 The Natural Occurrence of Short-Lived Radioisotopes. Isaac Asimov. *Journal of Chemical Education*, v. 30, Dec. 1953, p. 616-618.

Includes tables. 4 ref.

3993 A Mass Spectrometer for High Precision Isotope Ratio Determinations. R. Wanless and H. G. Thode. *Journal of Scientific Instruments*, v. 30, Nov. 1953, p. 395-398.

A conventional 90° mass spectrometer has been modified to permit simultaneous collection and measurement, by means of a null method, of ion currents due to isotopic species of sulphur dioxide at masses 64 and 66. Diagrams. 10 ref.

3994* Photography in Nuclear Physics. (Russian.) Iu. Sh. Moshkovskii. *Nauka i Zhizn*, v. 20, no. 7, July 1953, p. 17-20.

Thick photographic emulsion was used to determine energies of nuclear particles. Diagrams, micrographs.

3995* Particles From the Cosmos. (Russian.) N. G. Birger and L. Kh. Eidus. *Nauka i Zhizn*, v. 20, no. 8, Aug. 1953, p. 9-11, 13.

Presents a generalized description of π- and μ-mesons. Discusses nature of electron-nuclear showers and cascades. Photograph, diagram.

3996 Our New Urgent National Goal—Development of Economic Nuclear Power. Thomas E. Murray. *Nucleonics*, v. 11, Dec. 1953, p. 8-9, 56-57.

3997 The Future of Heavy Water Reactors. L. Kowarski. *Nucleonics*, v. 11, Dec. 1953, p. 10-14, 23.

Condensed from paper presented at The Heavy Water Reactor Conference at Oslo, Norway, Aug. 1953. Properties of heavy water that have made it useful in existing reactors will make substantial power-output improvements possible in future natural U reactors. Table.

3998 Current Research in Radiobiology. Alma Howard and Michael Ebert. *Nucleonics*, v. 11, Dec. 1953, p. 18-23.

Status of international work in radiation protection, DNA synthesis, and radiosensitivity is surveyed. 18 ref.

3999 Absolute Beta Measurement of Tritium Monolayers. D. E. Beischer. *Nucleonics*, v. 11, Dec. 1953, p. 24-27.

Attempts were made to evaluate radioautographs in a quantitative way as a simple means of localization of radioisotopes in biological specimens. Application of tagged monolayers as secondary standards was developed for quantitative C-14 radioautography. Graphs, table, photograph. 16 ref.

4000 Experimental Techniques in Beta-Ray Spectroscopy. I. C. Sharp Cook. *Nucleonics*, v. 11, Dec. 1953, p. 28-31.

Considers techniques for source preparation; methods of γ-ray measurement; and design problems of intermediate, evacuated regions of the spectrometer. Graphs, photographs. 37 ref. (To be continued.)

4001 Radiation Sterilization. IV. Application of Isotopic Sources to Food and Drug Sterilization. L. E. Crean, P. J. Isaacs, G. J. Weiss, and F. Fahnoe. *Nucleonics*, v. 11, Dec. 1953, p. 32-37.

Includes graphs, tables, diagrams. 7 ref.

Nuclean Physics, Nucleonics, and Radiation

4002 Fast-Coincidence Circuit for H^3 and C^{14} Measurements. R. D. Hiebert and R. J. Watts. *Nucleonics*, v. 11, Dec. 1953, p. 38-41.

Includes photographs, diagrams. 4 ref.

4003 Properties of Long Columns of Scintillating Liquids. W. A. Schneider, J. Hershkowitz, and H. Kallman. *Nucleonics*, v. 11, Dec. 1953, p. 46-48.

Describes investigation for measuring high-energy particles. Diagrams, graphs, photograph.

4004 Evaluating Beta Energy Dependence in End-Window G-M Tubes. U. L. Upson. *Nucleonics*, v. 11, Dec. 1953, p. 49-54.

This method can be used to obtain good approximation to absolute β counting without need for determining each of the many factors involved. Diagram, tables, graphs. 27 ref.

4005 Ionization-Chamber Device for Clinical Gamma-Ray Use. M. A. Bullen. *Nucleonics*, v. 11, Dec. 1953, p. 15-17.

Describes devices for measuring therapeutic or diagnostic amounts of radioactive materials in hospitals. Graphs, diagrams. 10 ref.

4006* An Investigation on Jets. (English.) C. Castagnoli, G. Cortini, C. Franzinetti, A. Manfredini, and D. Moreno. *Nuovo cimento*, v. 10, ser. 9, no. 11, Nov. 1, 1953, p. 1539-1558.

Presents a statistical method for determination of energy of primary of a nucleon-nucleon collision in which secondary particles are produced. Graphs, tables. 13 ref.

4007* On the Scattering of μ-Mesons by Nuclei. (English.) R. Gatto. *Nuovo cimento*, v. 10, ser. 9, no. 11, Nov. 1, 1953, p. 1559-1581.

Incoherent electric cross section and dependence on nuclear model employed are considered. Tables, graphs.

4008* D,D Neutron Scattering and Polarization Effects in C^{12} (English.) R. Ricamo. *Nuovo cimento (Suppdemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1607-1615.

D,D neutron polarization has been established by measuring azimuthal dependence of differential cross-section of C^{12}. Graphs. 14 ref.

4009* An Analysis of the Electron Pairs Produced in Nuclear Emulsions by Cosmic Rays Photons. (English.) G. Baroni, A. Borsellino, L. Scarsi, and G. Vanderhaeghe. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1653-1661.

Comparison has been made between theory of electron pair production by photons and experimental data for energies up to 400 m.e.v. Graphs. 17 ref.

4010* Remarks on the Validity of the Tamm-Dancoff Method. (English.) G. Morpurgo and B. F. Touschek. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1681-1694.

Exact solution of problem corresponding to scattering of a meson by a nucleon was compared with that obtained by first approximation of Tamm-Dancoff method. 9 ref.

4011* Adiabatic Nuclear Potential for Large Values of the Coupling Constant. (English.) M. Cini and S. Fubini. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12. Dec. 1, 1953, p. 1695-1703.

Method for caluculation of adiabatic potential between two fixed nucleons was proposed giving a sequence of approximations in which only a limited number of mesons and pairs is taken into account. 12 ref.

4012* On the Existence of Unstable Charged Particles of Hyperprotonic Mass. (English.) A. Bonetti, R. Levi Setti, M. Panetti, and G. Tomasini. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1736-1743 + 1 plate.

Further evidence available from photographic emulsion and cloud chamber experiments is discussed. In two cases, decay product was a fast light particle and in one case it was a slow proton arising from the end of the primary track. Tables, graphs, photograph.

4013* The Ferroxcube Transformer Core Used in the Brookhaven Cosmotron. F. G. Brockman and M. W. Louwerse. *Philips Technical Review*, v. 15, Sept. 1953, p. 73-83.

Describes basic design of the Cosmotron; operation of acclerating unit; and manufacture of ferroxcube frames. Diagrams, graphs, photographs.

4014 Experiments on the *g*-Factor of the Electron. (English.) F. Bloch. *Physica*, v. 19, no. 9, Sept. 1953, p. 821-831. Includes mathematical analysis. 20 ref.

4015 A Collective Description of Electron Interactions. III. Coulomb Interactions in a Degenerate Electron Gas. David Bohm and David Pines. **IV. Electron Interaction in Metals.** David Pines. *Physical Review*, v. 92, ser. 2, Nov. 1, 1953, p. 609-636.

Includes graphs. 30 ref.

4016 Angular Correlation of the Gamma Rays from Mn. F. R. Metzger and W. B. Todd. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 904-906.

Angular correlations of γ rays of Fe^{56} emitted in decay of Mn^{56} have been studied using NaI scintillation counters. Graphs. 12 ref.

4017 Spontaneous Fission Yields From Uranium and Thorium. George W. Wetherill *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 907-912.

Relative yields were determined by extracting Xe and Kr from geologically old U and Th minerals and measuring the isotopic abundances of these gases in a mass spectrometer. Graphs, diagrams, tables. 23 ref.

4018 Alpha-Gamma Angular Correlation in Ionium (Th^{230}). G. M. Temmer and J. M. Wyckoff. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 913-917.

Angular correlation between the α particle leading to first excited state of Ra^{226} at 67.8 k.e.v. and subsequent γ ray to ground state leads to a definite assignment of $I=2^+$ for this state. Graphs, table. 23 ref.

4019 Neutron-Deficient Isotopes of Thallium. I Bergström, R. D. Hill, and G. de Pasquali. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 918-923.

Work is concerned mainly with an investigation of Tl activities in an attempt to understand why isomers which might be expected to exist in Tl and Hg have not been observed. Tables, diagrams. 13 ref.

4020 Large-Angle Scattering of Co^{60} Gamma Rays. Thomas D. Strickler. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 923-926.

Measurements of scattering of Co^{60} γ rays from Pb, Sn, Cu, and Al have been made at a mean angle of 135°. In addition to Compton scattering and annihilation radiation, some higher energy components are present. Elastic scattering was observed in each of these scatterers and cross section for this process has been measured. Graphs, table, diagrams. 15 ref.

4021 Method for the Determination of the End-Point Energy of Beta Emitters. F. Forro. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 931-933.

It was found that absorption of β spectra in materials of high atomic number is exponential. Graph, table.

4022 Scintillation Spectrometer Determination of *L*-Capture to *K*-Capture Ratio in Cd^{109} and I^{125}. E. der Mateosian. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 938-940.

A useful technique of scintillation spectrometry was developed. Graphs, table. 8 ref.

4023 Nuclear Spin Relaxation by Translational Diffusion. H. C. Torrey. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 962-969.

Includes tables. 5 ref.

4024 Positive Pi-Meson Interactions in Beryllium. F. H. Tenney and J. Tinlot. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 974-977.

A 10-in. diameter cloud chamber containing a ¼-in Be plate has been operated in both 40- and 50-m.e.v. π^+-mesons beams

of the Rochester 130-in. cyclotron. Meson interactions in Be were obtained for three bands of energy: 15 to 30, 25 to 40, and 35 to 50 m.e.v. Graphs, tables. 18 ref.

4025 Interpretation of Electron Scattering Experiments. L. I. Schiff. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 988-993.

Includes graphs. 11 ref.

4026 Convergence of the Adiabatic Nuclear Potential. II. Abraham Klein. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 1017-1020.

11 ref.

4027 Nuclear Forces in Pseudoscalar Meson Theory. K. A. Brueckner and K. M. Watson. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 1023-1035.

Includes table, graphs. 17 ref.

4028 Theory of Polarized Particles and Gamma Rays in Nuclear Reactions. Albert Simon. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 1050-1060.

13 ref.

4029 Inelastic Collisions Between Heavy Particles. I. Excitation and Ionization of Hydrogen Atoms in Fast Encounters With Protons and With Other Hydrogen Atoms. D. R. Bates and G. Griffing. *Physical Society, Proceedings*, v. 66, no. 407A, Nov. 1953, p. 961-971.

Includes graphs. 16 ref.

4030 Low-Pressure Cloud Chamber. Robert G. Mills. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1041-1045.

An expansion cloud chamber has been developed which operates at a pressure before the expansion of about 45 millimeters of Hg. Graphs, diagram, photograph.

4031 Gamma-Ray Energy Resolution With NaI-Tll Scintillation Spectrometers. C. J. Borkowski and R. L. Clark. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1046-1050.

Describes method for preparing and mounting NaI-Tll crystals for scintillation spectrometers which gives high optical efficiency, stability, and good γ-ray energy resolution. Graphs, tables.

4032 A Cloud Chamber for the Study of Particles of Low Energy. T. C. Merkle and J. L. Need. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1051-1054.

Discusses cloud chamber with a magnetic selection flavoring low-energy particles. Photographs, diagram.

4033 Deterioration of Boron Trifluoride Counters Due to High Counting Rates. Robert K. Soberman, Serge A. Korff, Stephen S. Friedland, and Henry S. Katzenstein. *Review of Scientific Instruments*, v. 24, Nov. 1953, p. 1058-1060.

Theory is proposed which would explain deterioration on basis of a negative sheath which is formed when BF_3 dissociates. Tables, graphs.

4034* Wave Functions of the Hydrogen Molecular Ion. D. R. Bates, Kathleen Ledsham, and A. L. Stewart. *Royal Society of London, Philosophical Transactions*, v. 246, ser. A, no. 911, Nov. 5, 1953, p. 215-240.

Various states of the hydrogen molecular ion are investigated. Results are given as tables of parameters from which electronic wave functions can be obtained. Presents representative selection of contour diagrams. Graphs, tables.

4035* Theoretical Studies in Nuclear Structure. IV. Wave Functions for the Nuclear *p*-Shell. B.($p^n/p^{n-2}p^2$) Fractional Parentage Coefficients. J. P. Elliott, J. Hope, and H. A. Jahn. *Royal Society of London, Philosophical Transactions*, v. 246, ser. A, no. 912, Nov. 5, 1953, p. 241-279.

Includes tables.

4036 International Congress on Cosmic Radiation at Bagneres de Bigorre. *Science*, v. 118, Dec. 11, 1953, p. 701-707.

Discusses K-mesons and hyperons. Photograph.

See also:

2863 (gamma radiation from Co)
2879 (bactericidal efficiency of ionizing radiation)
2932 (ceramics in nuclear reactors)
3067 (detergents for radiological decontamination)
3490 (cosmic rays and radio-astronomy relationship)
3550 (tracer techniques)
3554 (control system for Van de Graaff generator)
3556 (applications of radio-isotopes in the rubber industry)
3560 (nuclear reactors for industry and research)
4193 (radio-isotopes in wool research)

OPERATIONS RESEARCH AND MANAGEMENT ENGINEERING

4037* Mathematical, or "Linear," Programming: A Nonmathematical Exposition. Robert Dorfman. *American Economic Review*, v. 43, Dec. 1953, p. 797-825.

Presents graphical representation of method. Graphs.

4038* Safety Is Our Business. John T. Ryan. *American Engineer*, 1953, Nov., p. 19-21.

Engineers are taking steps to reduce annual accidental toll of 15,000 deaths and 2,000,000 injuries. Photographs.

4039* Patent Fundamentals for Engineers. II. Henry K. Leonard. *American Engineer*, 1953, Nov., p. 25-28.

4040* Patent Fundamentals for Engineers. III. Henry K. Leonard. *American Engineer*, 1953, Dec., p. 30-31, 49.

4041 Statistical Quality Control. The Introduction of a Form of Sampling Inspection. L. Griffiths. *Automobile Engineer*, v. 43, Nov. 1953, p. 453-458.

Reviews elementary statistical theory, control charts, control limits, sampling intervals, and applications to automatic production. Graphs, tables. 12 ref.

4042 Wright Turbo Compound Engines Built on Automatic Assembly Lines. *Automotive Industries*, v. 109, Dec. 1, 1953, p. 52-55.

Use of conveyor lines and pallets for moving engine parts to sub-assembly stations results in a large saving of time. Automatic torque machines reduce manual effort and assure uniform results. Photographs, diagrams.

4043 Experiments With Many Factors. K. A. Brownlee. *Chemical Engineering Progress*, v. 49, Nov. 1953, p. 617-621.

4044 Industrial Research—The Big Picture. *Chemical Week*, v. 73, Dec. 12, 1953, p. 40-44, 46, 48, 50.

Discusses trends in companies supporting research, costs, and personnel. Graphs.

4045 Control of Automatic Conveying Systems. A. J. Schenk. *Electrical Manufacturing*, v. 52, Dec. 1953, p. 86-89.

Electrical interlock and traffic control circuits provide precise synchronization in a new type of conveyor system. Photographs, diagrams.

4046* Prescription for Preventing Handling Accidents. *Flow*, v. 9, Dec. 1953, p. 60-72.

A comprehensive prescription of rules and suggestions for safety in the use of material handling equipment. Photographs, diagrams.

4047* Manual to Mechanized. *Food Engineering*, v. 25, Dec. 1953, p. 83, 135-136.

Describes mechanical equipment used by dry-fruit handlers, resulting in savings in work, time, space, money, and cleaning operations. Photographs.

4048 Statistical Quality Control. A. J. Kukla. *Foundry*, v. 81, Dec. 1953, p. 120-124, 248-249.

Describes quality control procedures in sand control and melting and molding operations in foundries. Charts.

4049* The Elimination of Safety Hazards in Press Operations. Charles E. Meldrum. *General Motors Engineering Journal*, v. 1, Nov.-Dec. 1953, p. 15-21.

Includes photographs. 7 ref.

Operations Research and Management Engineering

4050* Mathematics Necessary for Quality Control in Mass Production. Mario Parran. *General Motors Engineering Journal*, v. 1, Nov.-Dec. 1953, p. 22-27.

Statistical methods make possible optimum use of raw materials and machines; increased economy in production; and improves standards of manufactured goods. Tables, graphs. 8 ref.

4051* Methods Engineering for More Effective and Economical Use of Manpower. R. D. McLandress. *General Motors Engineering Journal*, v. 1, Nov.-Dec. 1953, p. 28-30.

Includes diagram. 6 ref.

4052* Engineering Personnel Management in a General Motors Division. Charles L. McCuen. *General Motors Engineering Journal*, v. 1, Nov.-Dec. 1953, p. 32-37.

Discusses current policies in practice. Photographs.

4053 Engineered Fire Protection at Corn Products Refining Co. *Industry and Power*, v. 65, Dec. 1953, p. 70-73.

Personnel, operations, and facilities at Argo Plant are protected against fire by carefully planned and engineered alarm and protective systems. Covering process, storage, and handling activities, their program retains its flexibility in spite of constant plant expansion. Photographs.

4054 Practical Learning Curves Improve Shop Performance. C. T. Dennington. *Iron Age*, v. 172, Nov. 26, 1953, p. 108-111.

Charts are presented to make mathematical concepts of time studies and estimates more meaningful to shop personnel. Graphs.

4055 Proceedings of the Second Annual Short Course on Occupational Vision. *Louisiana State University Engineering Experiment Station Bulletin no.* 39, 1952, 82 p. (TP1 L93b)

Includes "Analyzing Visual Tasks", Richard Feinberg; "Employee Attitudes and Economic Advantages of an Industrial Vision Program", Dorothy Brinkley; "Administration of a Vision Program for Highway Safety", H. D. Tarvia Jones; "Influence of Vision on Highway Safety Research Findings of a State University", D. J. Moffie; "The Safety Program of the Baton Rouge Plant of the Ethyl Corporation", Carroll A. Hebert; "Color Dynamics and Safety", J. P. Ward, Jr.; "Lighting for Human Efficiency and Welfare", Sylvester K. Guth; "Industrial Management and What Vision Can Contribute", Robert Clair; "The Interpretation of Visual Screening Tests", Carl F. Shepard; and "What the Motorist Sees and Doesn't See", Maxwell Halsey. Graphs, photographs, diagrams. 7 ref.

4056* Quality Control Is Key to Gear Manufacture at Harvester's Tractor Works. Peter H. Slager. *Machine and Tool Blue Book*, v. 49, Dec. 1953, p. 168-172, 174, 176.

Includes photographs.

4057* Sorting and Selector Mechanisms for Hopper Feeds. III. W. M. Halliday. *Mechanical Handling*, v. 40, Dec. 1953, p. 584-587.

Includes diagrams. (To be continued.)

4058* Grabs. A Survey of Literature. A. G. E. Carrier. *Mechanical Handling*, v. 40, Dec. 1953, p. 592-599.

A review of clam shells for cranes. Graphs, table, diagrams. 35 ref.

4059* Mechanization of Auxiliary and Preliminary Works on Lumbering Installations. (Russian.) A. G. Zheludkov. *Mekhanizatsiia Trudoemkikh i Tiazhelykh Rabot*, 1953, no. 9, Sept., p. 5-9.

Discusses various mechanization and electrification improvements needed on installations and railroads connected with the lumbering industry. Tables.

4060* A Statistical Quality Control Approach to the Control of Plating Solutions. Allan D. Woodell. *Metal Finishing*, v. 51, Dec. 1953, p. 54-58.

Discusses technique as a system of inspection, analysis, and action. Photograph, charts.

4061* More in Common Than in Conflict. Stanley E. Walters. *Paper Trade Journal*, v. 137, Dec. 11, 1953, p. 49-52, 55-56, 58-60.

Includes "Company's Attitude Toward the Union", John W. Gray, Jr.; "Union's Attitude Toward Management", Huston Mattson; "The Athletic Association and Its Activities", George A. Meacham, Jr.; "We Handle Grievances", Thomas E. Brookover; "Cooperative Clinics", Charles F. Loughlin; "Training In-Plant and Outside Courses", William W. E. Ash, Jr.; "The Union on Job Evaluation", Huston Mattson; "The Company On Job Evaluation", John W. Gray, Jr.; "Medical Program—Blood Program", Thomas E. Brookover; "Safety Activtiies", George A. Meacham, Jr.; "The Diary and the Suggestion System", William W. E. Ash, Jr.; "Union Leaders Attending Management Conferences", John W. Gray, Jr.; "Joint Taft-Tartley Statement", George A. Meacham, Jr.; "Publications Sent Out Jointly, and ECA Visitors", Charles F. Loughlin; "Union Community Activities", Huston Mattson; "Evidence of Thoughtfulness", William W. E. Ash, Jr.; and "Further Remarks", Stanley E. Walters; "Additional Remarks From the Floor", F. Huston McIlvain.

4062* Developing Executive Ability. *Times Review of Industry*, v. 7, new ser., Dec. 1953, p. 12, 15, 21.

See also:
3723 (safety in foundries)
3915 (safety measures in stamping plants)
3972 (health hazards in rock drilling)
4250 (safety in welding)
4274 (quality control in welding)

PHYSICS

4063* Determining Elastic Constants of Isotropic Solids by Means of Ultrasound. (German.) E. Ledinegg and P. Urban. *Acta Physica Austriaca*, v. 8, no. 1, Oct. 1953, p. 16-27.

Specimens were placed in a double-walled reverberation chamber and resulting mistuning measured. Results were then used for computing elastic constants. 4 ref.

4064* Determination of the Pseudopermeabilities of Ferromagnetic Metals in Centimeter-Wave Range. (German.) Ernst Ledinegg and Paul Urban. *Archiv der elektrischen Ubertragung*, v. 7, no. 11, Nov. 1953, p. 523-530.

Describes two methods which reduce relative errors of measuring. Resonance behavior of a cavity resonator was determined with consideration of eddy-current losses and internal inductivity of the rims. Diagrams. 10 ref.

4065 A Method for the Evaluation of Some Lattice Sums Occurring in Calculations of Physical Properties of Crystals. B. M. E. van der Hoff and G. C. Benson. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1087-1094.

Includes tables. 20 ref.

4066 First Sound in Liquid Helium at High Pressures. K. R. Atkins and R. A. Stasior. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1156-1164.

Velocity of ordinary sound in liquid He has been measured in temperature range from 1.2 K to 4.2 K at pressures up to 69 atm. Tables, graphs, diagram. 8 ref.

4067 Special Objectives With a Large Numercial Apurture. (French.) Jean Lefaivre. *Canadian Journal of Physics*, v. 31, Nov. 1953, p. 1182-1184.

A dry objective of numerical aperture 0.84 has been computed for special purposes. It is a catadioptric objective of the centered type, after the terminology of Bowers. It is not achromatic. Diagrams. 2 ref.

4068 Heat Transfer by Conduction. Henry E. Robinson. *Ceramic Industry*, v. 61, Nov. 1953, p. 53, 75-76.

6 ref.

4069* Study of Post-Luminescence of Helium Excited by Centimeter Waves. (French.) Joseph Janin and Ivan Eyraud. *Comptes rendus*, v. 237, no. 18, Nov. 2, 1953, p. 1073-1075.

Influence of pressure and power was studied for different radiations. Graphs.

4070* Properties of α and β Uranium Sulfides. (French.) Marius Picon and Jean Flahaut. *Comptes rendus*, v. 237, no. 19, Nov. 9, 1953, p. 1160-1162.

Briefly discusses X-ray spectrum, crystalline structure, densities, magnetic susceptibilities, and production of U_2S_3.

4071* The Acoustics of Supersonic Moving Bodies. (French.) Paul Bloch-Dassault. *Comptes rendus*, v. 237, no. 19, Nov. 9, 1953, p. 1123-1126.

Examines theory of closed ballistic wave as applied to nature of detonations set off by airplanes in supersonic flight.

4072* Kinetics of Superconductivity Breakdown by a High-Frequency Field. (Russian.) I. M. Lifshits and M. I. Kaganov. *Doklady Akademii Nauk SSSR*, v. 90, no. 4, June 1, 1953, p. 529-531.

Expressions obtained permit construction of a dependency of experimentally observed magnitudes on basic parameters of the problem in all frequency fields. 3 ref.

4073* Modulation Method of Measuring Dispersion of Ultrasound. (Russian.) V. A. Zverev. *Doklady Akademii Nauk SSSR*, v. 91, no. 4, Aug. 1, 1953, p. 791-794.

Experiments were carried out on Ni wire. Velocity was found to be $5.3 \cdot 10^5 \pm 10\%$ cm. per sec. Diagram, graphs.

4074* Double-Reflecting Concentrator of Ultrasound. (Russian.) L. D. Rozenberg. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1091-1094.

Describes operation and advantages. Diagram, graphs. 7 ref.

4075 Electroluminescent Zinc Sulfide Phosphors. Horace H. Homer, Richard M. Rulon, and Keith H. Butler. *Electrochemical Society, Journal*, v. 100, Dec. 1953, p. 566-571.

Preparation of blue, green, and yellow electroluminescent ZnS phosphors is described. Color of blue and green phosphors containing Cu and Pb is being determined by Cu and chloride concentrations. Yellow phosphors are triple-activated, containing Cu, Pb, and Mn. Graphs. 10 ref.

4076 Electroluminescence of Insulated Particles. Laurence Burns. *Electrochemical Society, Journal*, v. 100, Dec. 1953, p. 572-579.

Some mechanisms are considered to explain luminescense of a region on or near surface of a semiconducting phosphor particle embedded in a dielectric medium. Diagrams. 25 ref.

4077* Molecular Force Fields. XV. The Potential Energy Function and Raman Spectrum of BF_3. W. R. Heslop and J. W. Linnett. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1262-1273.

Includes tables, graphs. 23 ref.

4078* The Application of Limit Analysis to Punch-Indentation Problems. R. T. Shield and D. C. Drucker. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 453-460.

Limit analysis is applied to obtain upper and lower bounds for punch pressure in indentation of plane surface of an elastic-perfectly plastic material by a flat rigid punch. Two-dimensional flat punch, three-dimensional flat square, and rectangular punch problems are considered. Graphs, diagrams. 13 ref.

4079* Transverse Impact on Beams and Plates. A. C. Eringen. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 461-468.

Flexural deflections of several plates and beams under an unknown transverse, concentrated, time-dependent force are solved for various edge conditions. Graphs. 17 ref.

4080* Buckling of Multiple-Bay Ring-Reinforced Cylindrical Shells Subject to Hydrostatic Pressure. W. A. Nash. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 469-474.

An analytical solution is presented for problem of elastic instability of a multiple-bay ring-reinforced cylindrical shell subject to hydrostatic pressure applied in both radial and axial directions. Method used is that of minimization of the total potential. Diagrams. 20 ref.

4081* Analog Solution for Beams Excited by an Arbitrary Force. W. T. Thomson and T. A. Rogers. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 482-484.

In the illustration a simple example was chosen. Only the deflection under the load was obtained. Diagrams, graphs.

4082* Toroidal-Shell Expansion Joints. N. C. Dahl. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 497-503.

A thin toroidal shell of center-line radius a and torus mid-surface radius b is slit at its inner edge and welded to relatively stiff cylindrical pipe sections to form an expansion joint. Graphs, photographs.

4083* Flexural Wave Solutions of Coupled Equations Representing the More Exact Theory of Bending. Julius Miklowitz. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 511-514.

New method for deriving flexural wave solutions for Timoshenko bending theory is presented. 10 ref.

4084* Analysis of a Nonlinear Dynamic Vibration Absorber. L. A. Pipes. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 515-518.

Presents a mathematical analysis of action of a dynamic vibration absorber. System analyzed consists of a main mass attached to a rigid foundation by a linear spring coupled to absorber mass by a spring of nonlinear characteristics. Diagrams. 8 ref.

4085* Dynamic Stress-Strain Relations for Annealed 2S Aluminum Under Compression Impact. J. E. Johnson, D. S. Wood, and D. S. Clark. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 523-529.

Presents results of an experimental study of stress-strain relation of annealed 2S Al when subjected to compression impact. Graphs, diagrams, table. 20 ref.

4086* The Effect of Strain Hardening in an Annular Slab. P. G. Hodge, Jr. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 530-536.

Procedure is outlined for obtaining stresses and strains in a circular slab with a cutout, subject to uniform biaxial tension. Diagrams.

4087* The Rate of Growth of Vapor Bubbles in Superheated Water. Paul Dergarabedian. *Journal of Applied Mechanics*, v. 20, Dec. 1953, p. 537-545.

Calculations are presented for dynamic stability of vapor and air bubbles in superheated water. Graphs, photographs. 10 ref.

4088 Radioisotopic High-Potential, Low-Current Sources. John H. Coleman. *Nucleonics*, v. 11, Dec. 1953, p. 42-45.

Batteries using an $Sr^{90} - Y^{90}$ source and a polystyrene insulator are smaller, lighter, and less expensive to operate than chemical batteries. Diagrams, graphs, photographs. 8 ref.

4089* On Quantum Field Theory. I. Explicit Solution of Dyson's Equation in Electrodynamics Without Use of Feynman Graphs. (English.) E. R. Caianiello. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1634-1652.

A compact explicit expression is given for term of arbitrary order in power series expansion of Dyson's S-matrix for any arbitrary scattering process. 4 ref.

4090* The Decay of the Space Charges in Intermittent Discharges in Neon and Argon. (English.) D. Brini and P. Veronesi. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1662-1672.

Influence of gas pressure and distance of electrodes is discussed. Diagrams, graphs. 4 ref.

4091* On the Scattering Theory of Relativistic Equations. (English.) E. Corinaldesi. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1673-1680.

Parzen's method of evaluating phase shift at infinite energies was extended to the case when potential has a pole at origin. 4 ref.

Physics

4092* Mass Quantization and Isotopic Spin in Non Local-Field Theory. (English.) J. Rayski. *Nuovo cimento (Supplemento)*, v. 10, ser. 9, no. 12, Dec. 1, 1953, p. 1729-1735.

Presents a non-local generalization of Dirac equation that leads to a mass spectrum for particles of spin ½. 7 ref.

4093 The Calibration of Infrared Prism Spectrometers. A. R. Downie, M. C. Magoon, Thomasine Purcell, and Bryce Crawford, Jr. *Optical Society of America, Journal*, v. 43, Nov. 1953, p. 941-951.

A search was made for sharp absorption maxima suitable for calibrating infra-red prism spectrometers at closely spaced intervals. A set of such points, corrected and tested, is presented with traces showing appearance of calibration spectra and conditions for reproducing them. Graphs, tables. 20 ref.

4094 On the Relation Between the Speed of Response and the Detectivity of Lead Sulfide Photoconductive Cells. R. Clark Jones. *Optical Society of America, Journal*, v. 43, Nov. 1953, p. 1008-1013.

Includes graph. 12 ref.

4095* Problems of Interpretation of Quantum Electro-Dynamics. (English.) L. Rosenfeld. *Physica*, v. 19, no. 9, Sept. 1953, p. 859-867; disc., p. 867-868.

Reviews general features of electromagnetic interactions in its present form. 13 ref.

4096 Oxygen Vacancies in Barium Oxide. R. L. Sproull, R. S. Bever, and G. Libowitz. *Physical Review*, v. 92, ser. 3, Oct. 1, 1953, p. 77-80.

The band at 2.0 e.v. occurs when a BaO crystal is treated with Ba or other metallic vapors. Diffusion of the blue color was measured from 800 to 1300 C. Concludes that principal lattice defects are oxygen vacancies. Photographs, tables, graphs. 21 ref.

4097 Saturation Effects in Paramagnetic Resonance. A. H. Eschenfelder and R. T. Weidner. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 869-873.

Saturation effects have been observed in paramagnetic resonance absorption of 3.2-cm microwaves by diluted samples of iron ammonium alum and chromium potassium alum at 2 to 4 K. Graphs. diagram. 9 ref.

4098 Transition Temperatures of Superconductors. B. T. Matthias. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 874-876.

Superconductivity has been found in a number of new compounds between non-superconducting transition elements and nonmetals such as Si, Ge, and Te. Tables, graph. 15 ref.

4099 Change of Electrical Conductivity of Sodium Chloride Upon Bombardment With High-Energy Protons. Edgar A. Pearlstein. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 881-882.

Conductivity of NaCl in the region 125 C to 400 C is considerably decreased by bombardment at room temperature with 10^{18} protons per cm^3 of energy 350 m.e.v. Diagram, graph. 5 ref.

4100 Interaction of a Nonrelativistic Particle With a Scalar Field With Application to Slow Electrons in Polar Crystals. Tsung-Dao Lee and David Pines. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 883-889.

A general variational technique is developed to study effect of recoil on motion of a nonrelativistic particle in a scalar field. 3 ref.

4101 Microwave Spectra of CsF, CsCl, and CsBr. A. Honig, M. L. Stitch, and M. Mandel. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 901-902.

Molecular constants for CsF, CsCl and CsBr have been determined from measurements of their pure rotational spectra in the microwave region. These and other data allow a test of constancy of ionic bonding radii. Measurements of isotopic species of these molecules give mass ratios of stable Cl and Br isotopes. Table. 6 ref.

4102 Influence of Electric and Magnetic Fields on Angular Correlations. A. Abragam and R. V. Pound. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 943-962.

Theory of influence on angular correlations of perturbing interactions in intermediate state is reformulated to allow description of effects of time-dependent as well as of static perturbations. Graphs, tables. 35 ref.

4103 Magnetic Moments of Neutron and Proton. F. J. Belinfante. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 994-997. 11 ref.

4104 The Hyperfine Structure of Hydrogen. R. Arnowitt. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 1002-1009. 10 ref.

4105 A New Modification of Classical Electromagnetic Theory. A. Schild. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 1009-1014.

A fundamental particle is treated as a unit charge whose rest mass and space time coordinates are variables of its motion. Graphs. 11 ref.

4106 Electromagnetic Mass and a Particle Model in Darling's Theory of Elementary Particles. Hans Freistadt. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 1015-1016.

Includes graphs. 7 ref.

4107 The Universal Fermi Interaction. E. J. Konopinski and H. M. Mahmoud. *Physical Review*, v. 92, ser. 2, Nov. 15, 1953, p. 1045-1049.

Includes diagram. 24 ref.

4108 The Production of Delta-Rays in Nuclear-Research Emulsions. D. A. Tidman, E. P. George, and A. J. Herz. *Physical Society, Proceedings*, v. 66, no. 407A, Nov. 1953, p. 1019-1031.

Theoretical formulae are derived which give the δ-ray density as function of velocity and charge of primary particle, taking into consideration the fact that the electrons in the emulsion are both bound and in motion. Graphs. 15 ref.

4109 The Elastic Scattering of 1.33 mev and 2.76 mev Gamma Rays by Lead. W. G. Davey. *Physical Society, Proceedings*, v. 66, no. 407A, Nov. 1953, p. 1059-1063.

Report is given measurements of elastic-scattering cross section of Pb for γ-rays of 1.33 and 2.76 m.e.v. at scattering angles between 40° and 120°. Graphs. 8 ref.

4110* Inverse Effect of Blade Cascade of a Turbine. (Russian.) R. M. Iablonik. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 5-9.

Presents mathematical formulas. Graphs.

Books and Miscellaneous Publications

4111 Annual Review of Nuclear Science. James G. Beckerley, Martin D. Kamen, Donald F. Mastick, and Leonard I. Schiff, editors. v. III. 412 p. 1953. Annual Reviews Inc., Stanford, Calif. (QC780 An78)

Includes "Reactions of π-Mesons With Nucleons", E. M. Henley, M. A. Ruderman, and J. Steinberger; "Mesons and Heavy Unstable Particles in Cosmic Rays", L. Leprince-Ringuet; "Extranuclear Interactions of Electrons and Gamma Rays", D. R. Corson and A. O. Hanson; "Neutron Optics", D. J. Hughes; "The Standardization of Neutron Measurements", A. Wattenberg; "Photographic Emulsions", Y. Goldschmidt-Clermont; "Radiation Chemistry", J. L. Magee; "Chemical Effects of Nuclear Transformations", J. E. Willard; "Separation Techniques Used in Radiochemistry", P. C. Stevenson and H. G. Hicks; "Isotope Effects in Chemical Reactions", P. E. Yankwich; "Radiation Dosimetry and Protection", L. D. Marinelli; "Vertebrate Radiobiology: Embryology", R. Rugh; "Vertebrate Radiobiology: Histopathology and Carcinogenesis", J. Furth and A. C. Upton; "Cellular Radiobiology", A. H. Sparrow and F. Forro, Jr.; and "Practical Aspects of Radiation Injury", L. H. Hampelmann and J. G. Hoffman.

4112 The Revolution in Physics. Louis de Broglie. 370 p. 1953. Noonday Press, New York, N. Y. (QC1741.1 B78ptr)

Covers classical mechanics and physics; atoms and corpuscles;

theory of relativity; appearance of quanta in physics; the atom of Bohr; correspondence principle; wave mechanics; Heisenberg's quantum mechanics; probability interpretation of the new mechanics; spin of the electron; and wave mechanics of systems and Pauli's principle.

4113 Dissociation Energies. A. G. Gaydon. 2nd Rev. Ed. 261 p. 1953. Chapman and Hall Ltd., London. (QD95 G25d2)

Deals with determination of dissociation energies, mainly from a spectroscopic standpoint, and also by thermal methods and by controlled electron impact.

4114 Stress Waves in Solids. (Book.) H. Kolsky. 211 p. 1953. Oxford Univ. Press, London. E. C. 4. (TG265 K83.6s)

Includes chapters on propagation in an extended elastic medium; propagation in bounded elastic media; experimental investigations with elastic materials; internal friction; experimental investigation of dynamic elastic properties; plastic waves and shock waves; and fractures produced by stress waves.

See also:
3047 (calculation of vibration spectra of formic acid)
3934 (investigations of spiral step growth)

PLASTICS

4115 Modifying Temperature Distribution Over Calendar Rolls by Electro-Magnetic Induction. Georges Ardichvili. *British Plastics*, v. 26, Nov. 1953, p. 400-401.

Includes diagrams.

4116 Moulds & Stresses. Gordon Stimpson. *British Plastics*, v. 26, Nov. 1953, p. 402-406.

Presents some considerations concerning effect of mold design upon residual stress in injection moldings. Diagrams. 5 ref.

4117 Plasticizer Technology. N. S. Mount. *Canadian Chemical Processing*, v. 37, Nov. 1953, p. 58.

Discusses types and functions.

4118 Vinyl Film. How Specifications Are Tailored to Use. R. C. Hawkins. *Canadian Chemical Processing*, v. 37, Nov. 1953, p. 60, 62, 64. 66.

Discusses properties; specifications and standards; tests; production; markets; and applications.

4119* Application of and Favorable Results Attained With Gutters and Drain Pipes Made of Polyvinylchloride. (German.) J. Jungnickel. *Chemische Technik*, v. 5, no. 9, Sept. 1953, p. 543-547.

Describes results achieved in substitution for Zn plate. Properties of "Vinidur" and "Decelith H" as plates and tubes are outlined. Discusses installation and weather resistance. Photographs.

4120* The Analytical Chemistry of Plastics. I. Analysis of Plasticizers by Aminolysis. (German.) K. Thinius and E. Schröder. *Chemische Technik*, v. 5, no. 10, Oct. 1953, p. 611-615.

Describes method and results achieved when applied to various plasticizers. Tables. (To be continued.)

4121* Effect of Substances Lowering the Surface Tension of Water Upon the Process of Emulsion Polymerization of Vinylchloride. (German.) W. Zielinski and S. Domanusowa. *Chemische Technik*, v. 5, no. 10, Oct. 1953, p. 615-616.

Reports on experiments with ethylene oxide. Tables.

4122* Influence of Molecular Weight, Form of the Molecule, and the Presence of Polar Groups on the Self-Adhesion of High Polymers. (Russian.) S. S. Voiutskii and B. V. Shtarkh. *Doklady Akademii Nauk SSSR*, v. 90, no. 4, June 1, 1953, p. 573-576.

In controlled experiments self-adhesion continually increases with duration of thermal processing. Graphs, tables. 3 ref.

4123* Plastic Domes Daylight Big Pumped-Gypsum Roof. *Engineering News-Record*, v. 151, Dec. 1953, p. 47-48.

Transparent plastic domes, with temporary thin protective coatings, are set in Al frames to form skylights at a new Signal Corps Depot, Tobyhanna, Penna. Photographs.

4124 Epoxy Fatty Acid Ester Plasticizers. Frank P. Greenspan and Ralph J. Gall. *Industrial and Engineering Chemistry*, v. 45, Dec. 1953, p. 2722-2726.

Describes a new series of vinyl plasticizers, distinguished by generally good over-all plasticizer properties combined with unique attributes of their own. Photographs, tables. 20 ref.

4125 Mean Dimensions of Rubber-Like Polymer Molecules. Frederick T. Wall. *Journal of Chemical Physics*, v. 21, Nov. 1953, p. 1914-1919.

Mean square end-to-end separations of coiling type polymer molecules were calculated by approximate methods, taking into account effect of excluded volumes. Diagrams. 7 ref.

4126* Nylon as an Engineering Material. *Machinery*, v. 83, Nov. 20, 1953, p. 1003-1006.

Describes properties, injection molding techniques, and applications of nylon moldings. Tables.

4127* Production Machining of Nylon Rod Stock. Ralph E. James, Jr. and George W. Swoyer. *Machinery*, v. 60, Dec. 1953, p. 163-166.

A substantial number of nylon parts are being machined from rod stock. This manner of fabrication is preferred where low-production requirements do not justify cost of molds or where tolerances are closer than can be maintained by molding. Photographs, diagrams.

4127a Large Plastic Moldings. John B. Campbell. *Materials & Methods*, v. 38, Dec. 1953, p. 91-95.

Presents general discussion of trend toward larger thermosetting moldings using new improved resins and better production techniques and equipment. Photographs, tables, diagrams, graphs.

4128 New Developments in Liquid Heating of Plastics-Processing Machinery. Paul L. Geiringer and Floyd Hasselriis. *Mechanical Engineering*, v. 75, Dec. 1953, p. 957-962, 986.

Includes diagrams, tables, photographs. 11 ref.

4129* A Method for the Measurement of Dynamic Mechanical Properties of Small Samples of Plastic Material. W. P. Van Oort. *Microtecnic (English Ed.)*, v. 7, no. 5, 1953, p. 246-255.

Includes diagrams, photographs, graphs, tables.

4130* Molded Plastics Find a Place. *Modern Packaging*, v. 27, Dec. 1953, p. 89-95, 188, 191-192.

Less glamour and more practicability of application mark steady growth of rigid molded containers in packaging. Photographs. 24 ref.

4131 Here Comes the Corvette. *Modern Plastics*, v. 31, Dec. 1953, p. 83-91, 201.

Describes tool costs, molding, and finishing of reinforced plastic automobile body. Photographs.

4132 What You Should Know About Plasticizers For Vinyls. E. B. Deckel. *Modern Plastics*, v. 31, Dec. 1953, p. 98-102.

Discusses types of plasticizers and role of plastizers in plastisols and water dispersions. Photographs, tables.

4133 "Extruded" Reinforced Plastics. *Modern Plastics*, v. 31, Dec. 1953, p. 105-107.

Describes extrusion machine enabling continuous production. Discusses properties and applications of the extrusions. Photographs, table.

4134 Injection Molding Rigid Vinyl. *Modern Plastics*, v. 31, Dec. 1953, p. 113-115.

Includes photographs.

4135 Highly Filled Glass-Polyester Plastics. R. F. Shannon and L. P. Biefeld. *Modern Plastics*, v. 31, Dec. 1953, p. 125-126, 128, 130, 132, 215, 219.

Describes mixing procedures, fillers, and molding operations. Graphs, tables.

Plastics

4136 Modified Phenol-Formaldehyde Resins. Thomas G. Harris, Roderick H. Horning, and Harvey A. Neville. *Modern Plastics*, v. 31, Dec. 1953, p. 136, 138, 140, 220, 223.

Modification of various intermediate phenol-form-aldehyde condensation products (resols) by means of 1,2 epoxides is described. Graphs, tables.

4137* Photosensitive Plastics. S. B. Elliot. *Photographic Engineering*, v. 4, 1953, p. 133-141.

Photosensitive plastics were developed by incorporating small quantities of halogenated compounds unstable to actinic light. Graphs, table.

4138 An Optical Method of Observing Stress Relaxation in Transparent Solids. S. M. Crawford. *Physical Society, Proceedings*, v. 66, no. 407B, Nov. 1953, p. 954-962.

Relaxation of birefringence produced in two organic glasses after they have been sheared in a modified coaxial cylinder viscometer has been followed at different temperatures by use of a photocell. Diagrams, graphs. 3 ref.

4139* Laboratory Apparatus to Investigate Chemical Resistance of Plastics. (Polish.) M. Grochowski. *Przemysl Chemiczny*, v. 9, no. 8, Aug. 1953, p. 404-406.

Physico-chemical conditions were measured by determining chemical penetration time. Photographs, table.

4140 What are Epoxy Resins? I. *Rubber Age and Synthetics*, v. 34, Sept. 1953, p. 301-302.

Presents description of formulas and properties. Table.

4141 Polymerisation of Methyl Methacrylate. III. Development and Application of Emulsions. *Rubber Age and Synthetics*, v. 34, Sept. 1953, p. 307.

4142 High Pressure in the Manufacture of Polythene. W. R. D. Manning. *Rubber Age and Synthetics*, v. 34, Sept. 1953, p. 308-310.

Discusses apparatus, experiments in development of the process, and future applications. Photograph, diagrams.

4143 Glass Fabrics as Used by the Plastics Industry. I. B. J. Brown. *Rubber Age and Synthetics*, v. 34, Sept. 1953, p. 314-315.

Discusses some aspects of fabric structure including glass yarns and types of weave structure of glass fabrics. Diagrams, tables. (To be continued.)

4144* Moulded Structures. F. G. Miles. *Rubber Age and Synthetics*, v. 34, Nov. 1953, p. 397.

Discusses use of phenolic impregnated asbestos in aircraft wings.

4145* Glass Fabrics as Used by the Plastic Industry. III. B. J. Brown. *Rubber Age and Synthetics*, v. 34, Nov. 1953, p. 400-401.

Presents reliable test methods for estimating residual emulsion content, preparing test laminates, and establishing flexural values. Diagram. (To be continued.)

4146* Extrusion of Polystyrene. *Rubber Age and Synthetics*, v. 34, Nov. 1953, p. 403, 405.

Discusses extruded film and bristles, stretching of polystyrene, physical properties, and applications.

4147* Specific Temperature, Specific Volume, Temperature Conductivity, and Heat Conductivity of High Polymers. II. Dependence Upon Chain Length of Fractionated Polystyrols. (German.) Kurt Ueberreiter and Evelyn Otto-Laupenmühlen. *Zeitschrift für Naturforschung*, v. 8a, no. 10, Oct. 1953, p. 664-673.

Reports on measurements made with improved instruments on four polystyrols. Tables, graphs. 9 ref.

See also:
2944 (metalizing of plastics)
3019 (infra-red spectra of polytetra-fluorethylene)
3107 (metallizing plastic sheet)
3623 (plastic automobile bodies)
3845 (plastic hardness testing)
3856 (compression tests on celluloid)
3962 (synthetic resins in powdered metals)

POLLUTION AND WASTES

4148 Air Pollution. C. J. Regan. *Chemistry & Industry*, 1953, no. 47, Nov. 21, p. 1238-1244.

Discusses history, sources, nature, measurement, and abatement. Graphs, tables. 24 ref.

4149* "Sweetens" Noxious Exhaust Gas. *Food Engineering*, v. 25, Dec. 1953, p. 95, 170.

A catalytic exhaust system is described which oxidizes harmful, contaminating carbon monoxide and hydrocarbon vapors from exhausts of lift trucks and other gasoline engines. Photographs, table.

4150 Industrial Process Water Symposium. *Industrial and Engineering Chemistry*, v. 45, Dec. 1953, p. 2647-2688.

Includes "Federal Water Pollution Act", Carl E. Schwob; "California Water Pollution Control Program", Warren T. Hannum; "Ohio River Valley Water Sanitation Compact. A Billion-Dollar River Cleanup Job", Edward J. Cleary; "Water Quality Related to Water Pollution in California", Vinton W. Bacon, George B. Gleason, and I. W. Walling; "Ground Water and Used Water in Basin Recharge Areas", Ross A. Shafer; "Improving the Quality of Water Resources", L. F. Warrick; "Disposal of Atomic Energy Industry Wastes. Some Environmental Aspects", Arthur E. Gorman; "Waste Disposal in the Los Angeles Area", A. M. Rawn; "Industrial Waste Treatment and Disposal at the Government Synthetic Rubber Plants, Los Angeles County, Calif.", Arthur E. Martin and Royal E. Rostenbach; and "Disposal of California Winery Wastes", Reese H. Vaughn and George L. Marsh.

4151* Electric Steel Foundries Control Dust Emissions in Los Angeles Area. O. E. Erickson. *Journal of Metals*, v. 5, Dec. 1953, p. 1625-1626.

Describes various types of dust collectors. Tube-type bag filter using Orlon bags has been the most successful. Table.

4152* Removal of Phenols From Industrial Waste. (Polish.) J. Nowacki and H. Zielinski. *Przemysl Chemiczny*, v. 9, no. 8, Aug. 1953, p. 409-413.

Presenst methods of removal, regeneration, and destruction of phenols. Physical, chemical, and biological methods are discussed. Graphs, tables, diagrams. 11 ref.

4153* Dust Problems in Steel Plants. (German.) Kurt Guthmann. *Stahl und Eisen*, v. 73, no. 23, Nov. 5, 1953, p. 1512-1524.

Discusses dust separation, precipitation difficulties, and grain size. Describes dust removal and separating plants and their efficiencies. Tables, graphs, diagrams, photographs. 37 ref.

4154* The Problem of Sea Water Pollution. John W. Mann. *U. S. Department of State Bulletin*, v. 29, no. 754, Dec. 7, 1953, p. 775-780.

Discusses studies of oil pollution made by the U. S., the League of Nations, and the United Nations.

See also:
3285 (water pollution)
3286 (pollution protection of fresh water sands)
3288 (disposal of waste water)
3289 (ability of stream to handle waste)
3290 (plant location influence by waste disposal)
3970 (dust removal in coal mining)

RUBBER AND ELASTOMERS

4155* Vulcanization and the Sulfur Bridge Theory. (German.) M. Rachner. *Chemische Technik*, v. 5, no. 10, Oct. 1953, p. 623-626.

Discusses literature and experiments with vulcanization of rubber. Reasons for rejection of sulfur bridge theory are explained. Tables, graphs. 5 ref.

4156* Characteristics of Light Aging of Vulcanizers. (Russian.) Iu. S. Zuev and A. S. Kuz'minskii. *Doklady Akademii Nauk SSSR*, v. 90, no. 6, June 21, 1953, p. 1063-1066.

Heat, light, and heat-light aging of films of unfilled vulcanizers

was examined. Results show close correlation between heat and light aging. Graphs, tables. 6 ref.

4157* Moduli of Rubber Under Static Pressure. (Russian.) G. M. Bartnev and V. I. Novikov. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1027-1030.

Filled and unfilled rubbers from crude SKS-30 and Shore hardness of 45 and 70 were examined. Graphs. 5 ref.

4158* Investigation of Reaction Mechanism of Accelerators for Rubber Vulcanization. (Russian.) G. A. Blokh. *Doklady Akademii Nauk SSSR*, v. 91, no. 5, Aug. 11, 1953, p. 1107-1110.

Free sulfur participates in the exchange reaction with sulfur atoms going into the structure of the accelerators. Table. 4 ref.

4159* Polymerization Phenomena in the Course of Vulcanization. (Russian.) B. Dogadkin, M. Fel'dshtein, A. Dobromyslova, V. Shkurina, and M. Kaplunov. *Doklady Akademii Nauk SSSR*, v. 92, no. 1, Sept. 1, 1953, p. 61-64.

Describes experiments showing presence of polymerization of a radical form in vulcanized systems containing disulfide and sulfamide accelerators. Graphs, table. 3 ref.

4160* Chain-Length Distribution Functions of Polymers After Random Degradation and Cross-Linking, With Particular Reference to Elastomers. W. F. Watson. *Faraday Society, Transactions*, v. 49, Nov. 1953, p. 1369-1374.

Presents a mathematical analysis. 7 ref.

4161 Rubber Reinforcement. A Generation of Research and the Unsolved Problems. Donald Parkinson. *India-Rubber Journal*, v. 125, Dec. 5, 1953, p. 28-31.

Discusses mechanism of reinforcing effect by small C particles on rubber.

4162 The Ash of Neoprene Compounds With Special Reference to Zinc Oxide. H. J. Stern and D. Hinson. *India-Rubber Journal*, v. 125, Dec. 5, 1953, p. 62-63.

Presents method of ZnO determination.

4163* Butyl Rubber Compounds for Curing Bags. A. F. Sayko. *India Rubber World*, v. 129, Dec. 1953, p. 348-353.

Improved formulations were made for automobile tire curing bags. Diagram, photographs, tables.

4164* Modern Vulcanization Processes. H. A. Freeman. *India Rubber World*, v. 129, Dec. 1953, p. 354-357.

Includes photographs.

4165 Aging Stability of Neoprene Latex. D. E. Andersen and R. G. Arnold. *Industrial and Engineering Chemistry*, v. 45, Dec. 1953, p. 2727-2730.

Includes graphs. 12 ref.

4166* Silicone Rubber Insulation for Traction Motor Frame Coils. *Railway Locomotives and Cars*, v. 127, Dec. 1953, p. 65-68.

Santa Fe modernized motors are given high current rating. None has failed due to insulation breakdown. Field coils approaching million-mile mark without signs of depreciation. Photographs.

4167 Use of Synthetic Rubber in Passenger Car Tires. I. J. Sjothun, P. S. Greer, and S. N. Rhodes. *Rubber Age*, v. 74, Nov. 1953, p. 231-237.

Presents a general discussion including advantages of synthetic treads, predominant factors in tread-wear resistance, and testing methods employed. Photographs, tables, graphs. 15 ref.

4168 Products Volatized From a Channel and a Furnace Black on Heating to 1000° C. S. L. Madorsky, V. E. Hart, and S. Straus. *Rubber Age*, v. 74, Nov. 1953, p. 238-242.

Discusses experimental procedure in pyrolysis. Reports main difference in results is in amount of volatiles, particularly water. Graphs, tables, diagram.

4169 The Reinforcement of Butyl With Carbon Black. II. Specific Action of Surface Oxygen. R. L. Zapp and A. M. Gessler. *Rubber Age*, v. 74, Nov. 1953, p. 243-251.

Describes how modifications of carbon black surface influence results obtained on heat treatment. Discusses changes in vulcanizate structure as a function of surface oxygen on the black. Graphs. 13 ref.

4170 The Neoprene Latices. Their General Characteristics-Compounding and Processing. II. W. G. Vennells. *Rubber Age and Synthetics*, v. 34, Sept. 1953, p. 291-292.

Discusses compounding, including vulcanizing ingredients, accelerators, antioxidants, and stabilizers. Tables. (To be continued.)

4171 Synthetic Latices for Surface Coatings. III. H. J. Stern. *Rubber Age and Synthetics*, v. 34, Sept. 1953, p. 295-296.

Presents some typical formulas and their applications. Table.

4172* The Neoprene Latices. IV. Their General Characteristics—Compounding and Processing. W. G. Vennells. *Rubber Age and Synthetics*, v. 34, Nov. 1953, p. 388-390.

Discusses processing and applications. Tables. (To be concluded.)

4173* Nitrile Rubber as Plasticisers for Polyvinyl Resins. S. E. Bolam. *Rubber Age and Synthetics*, v. 34, Nov. 1953, p. 392-393.

Discusses compounding, mixing, and extrusion. Photograph, table. 6 ref.

4174* Practical Rules for Compounding. (French.) Eugéne Stalinsky. *Revue générale du caoutchouc*, v. 30, no. 11, Nov. 1953, p. 792-793, 795-797.

Describes methods for choosing plasticity and recovery characteristics, adjusting start of vulcanization at a given temperature, developing a mixing formula for laboratory and industrial levels, and controlling fabrication procedures. Tables, graphs.

4175* Degradation of High Polymers. Dissociation Reactions During Oxidation of GR-S Solution. I. Experimental Part. (French.) J. Cortyl-Lacau. *Revue générale du caoutchouc*, v. 30, no. 11, Nov. 1953, p. 819-824.

Includes diagrams, graphs, table. (To be continued.)

See also:
3118 (hard rubber coatings)
3120 (temperature indicating paint)
4117 (plasticizers for rubber)
4187 (rubber fabric for coating)

SPACE HEATING AND CONDITIONING

4176* An Analysis of Basic Factors Affecting Ventilation Equilibrium. W. J. McGoldrick, Jr. *Agricultural Engineering*, v. 34, Dec. 1953, p. 815-824.

Presents a simplified analysis by solving equations graphically or with an analog computer. Graphs, diagrams.

4177 Heating Plant Performance. *Coal-Heat*, v. 66, Dec. 1953, p. 26-31.

Summarizes improvements resulting from program of modernization of school heating plants in Columbus, Ohio. Tables, graphs.

4178* Automatic Control of Air Conditioning Installations. Edward Dowis. *Commercial Refrigeration & Air Conditioning*, v. 10, Dec. 1953, p. 62-64, 86-87.

Describes equipment and operating procedures. Diagrams.

4179* Higher Secondary-Network Voltages. Are They Necessary? J. B. Hodtum. *Electric Light and Power*, v. 31, Dec. 1953, p. 87-88.

Rapid increase of air-conditioning load during last summer's abnormally high temperatures makes it necessary to consider use of higher voltages for secondaries in excess of present nominal 120/208 values. Tables, photograph.

4180* Forced Air Units Solve Tough Heating Problems. *Food Engineering*, v. 25, Dec. 1953, p. 131, 135.

Warm-air space heaters have solved difficult heating and air conditioning problems at minimum costs by providing comfortable working conditions for employees, preventing freezing of products, and guarding packages from damaging humidity. Photographs.

Space Heating and Conditioning

4181 Controlling Unit Ventilators on Hot Water Systems. Harold W. Alyea. *Heating, Piping & Air Conditioning*, v. 25, Dec. 1953, p. 80-83.

Discusses control of unit ventilators when hot water is the heating medium. Diagrams.

4182 Solar Energy Availability for Heating in the United States. R. C. Jordan and J. L. Threlkeld. *Heating, Piping & Air Conditioning*, v. 25, Dec. 1953, p. 111-122.

First of three articles dealing with availability of solar energy in the United States. Diagrams, graphs, tables. 16 ref.

4183 Automobile Air Conditioning—Progress and Problems. P. J. Kent. *Heating, Piping & Air Conditioning*, v. 25, Dec. 1953, p. 129-131.

Paper indicates some special problems to be overcome in designing air conditioning systems for cars. Shows how manufacturers have proceeded to provide suitable air conditioning.

4184 Air Conditioning Existing Buildings. Irwin Isaacson, Jr. *Heating and Ventilating*, v. 50, Dec. 1953, p. 81-83.

How to plan for such work is described by a design engineer with a firm that has had considerable experience cooling existing buildings. Photographs, diagram.

4185 Air Filters in Rotating Electrical Equipment Cooling Systems. Fred C. Reutenauer. *Iron and Steel Engineers*, v. 30, Nov. 1953, 71-79.

Discusses selection of equipment for cleaning the air supply to motor rooms and other installation. Diagrams, graphs, photographs.

4186* Dynamic Heating and Air Conditioning. (Russian.) G. V. Kolpakov. *Nauka i Zhizn*, v. 20, no. 9, Sept. 1953, p. 24-25.

Proposes a system using a heat pump, compressors, condensers, and heat exchangers. Diagrams.

See also:
3143 (corrosion in refrigerating systems)
3192 (motors for air conditioning units)
3623 (air-conditioning in auto factories)

TEXTILES AND FIBERS

4187* Nitrile Rubber Latices as Permanent Abrasion-Resistance Finishes for Blue Denim Fabric. Edward Abrams and Neil Sherwood. *American Dyestuff Reporter*, v. 42, Nov. 23, 1953, p. 777-782.

Synthetic rubber latices, especially acrylonitrile-butadiene mixtures, have been applied to blue denim yarn as a warp size. After standard launderings the latex-sized fabric increases in abrasion resistance. After 5 launderings abrasion resistance is approximately 100% greater than that of the original fabric. Tables, photographs, diagrams.

4188* Cotton—An Old Fiber With a New Future. Leonard Smith. *American Dyestuff Reporter*, v. 42, Nov. 23, 1953, p. P789-P791.

Principal objectives in this paper are to recall some of the developments that have taken place in cotton technology in the immediate past and to bring to attention the inevitable conclusion of these developments.

4189* Recent Advances in Dyeing "Orlon" Acrylic Fiber and "Dacron" Polyester Fiber and Blends of These With Other Fibers. J. F. Laucius. *American Dyestuff Reporter*, v. 42, Nov. 23, 1953, p. P792-P796.

A summary of recent advances. Tables. 13 ref.

4190* Alphabetical List of New Products Developed Since November, 1952. *American Dyestuff Reporter*, v. 42, Dec. 7, 1953, p. 809-842.

Lists dyestuffs, pigments, textile chemicals, and dyeing equipment. Photographs.

4191* The Dyeing and Processing of Synthetic Fibers. Ralph A. Travis. *American Dyestuff Reporter*, v. 42, Dec. 7, 1953, p. 845-847.

Discusses Dacron, Orlon, Dynel, and Acrilan.

4192* Acetate Blends of Improved Performance. F. Fortess, B. S. Sprague, and R. G. Stoll. *American Dyestuff Reporter*, v. 42, Dec. 7, 1953, p. 851-863; disc., p. 863.

Discusses functional requirements and performance of commercial fabrics. Tables, graphs, photograph.

4193* Some Applications of Radioactive Isotopes in Wool Research. A. Robson. *Atomics (British)*, v. 4, Dec. 1953, p. 320-324, 330.

Brief account of activities in Great Britain. Photographs. 8 ref.

4194* Reciprocal Compensation of Static Stresses and Relative Extensions in Fatigue Tests by Repeated Tensions. (French.) Albert Laborde. *Comptes rendus*, v. 237, no. 20, Nov. 16, 1953, p. 1211-1213.

Describes tests to determine quality of textile thread.

4195* Acetate Silk. (Russian.) A. Aleksandrov. *Nauka i Zhizn*, v. 20, no. 7, July 1953, p. 24.

Discusses increased Soviet production of artificial silk. Photographs.

4196* The Photochemistry of Dyes in Solution. Gerald Oster. *Photographic Engineering*, v. 4, 1953, p. 173-178.

Chemical nature of photobleaching of dyes in solution is outlined. Necessary conditions for photo-reduction of dyes are considered. Examples are given. Graphs, 14 ref.

4197* The Uses of Microscopy in Textile Dyeing and Finishing. G. G. Taylor and J. C. Brown. *Society of Dyers and Colourists, Journal*, v. 69, Nov. 1953, p. 396-402; disc., p. 402-403. + 4 plates.

Includes micrographs. 57 ref.

4198* Studies in the Fundamental Processes of Textile Printing. VI. The Transfer of Disperse and Water-Soluble Dyes to Nylon During Steaming. E. H. Daruwalla and H. A. Turner. *Society of Dyers and Colourists, Journal*, v. 69, Nov. 1953, p. 440-448.

Includes graphs, tables. 29 ref.

4199* Finishes for Cellulosic Textiles Giving Permanent Protection Against Microbiological Attack—A Survey of the Literature. Mary Hamlin. *Textile Institute, Journal, Proceedings and Standardization*, v. 44, Nov. 1953, p. P745-P753.

Describes modification of physical nature of fibre by use of thin film of resistant material and chemical modification of cellulose by esterification or etherification. 44 ref.

4200* Caustic Recovery by Evaporation. Cecil B. Ray. *Textile Industries*, v. 117, Dec. 1953, p. 111-112.

Facts that finishers should consider when planning caustic recovery by evaporation. Diagram.

4201* A Tool That Makes Dyeing Easier. R. H. Souther. *Textile Industries*, v. 117, Dec. 1953, p. 124-126.

Method uses an electronic instrument to measure the condition of whether the dyebath has the correct ratio of dye, reducing agent, and stabilizing agent to produce the desired shade. Photographs, graph.

4202* Determination of the Fatty Matter in Wool by Extraction With Diethyl Ether. F. F. Elsworth and J. Barritt. *Textile Institute, Journal, Proceedings and Standardization*, v. 44, Nov. 1953, p. P754-P759.

Describes sampling, apparatus, and method of extraction. Tables.

4203* Textile Terms and Definitions. *Textile Institute, Journal, Proceedings and Standardization*, v. 44, Nov. 1953, p. S53-S68.

Presents glossary of tentative definitions. Diagrams.

4204* Theoretical Study of Ring and Cap Spinning Balloon Curves (With and Without Air Drag). C. Mack. *Textile Institute, Journal, Transactions*, v. 44, Nov. 1953, p. T483-T498.

A mathematical study of properties of balloon curves is given. Diagrams, tables, graphs. 6 ref.

4205* Cotton Yarn Structure. IV. The Strength of Twisted Yarn Elments in Relation to the Properties of the Constituent Fibres. V. The Relation Between Strength Measurements Made on Fibres, Fibre Bundles, Yarns, and Cloth. J. Gregory. *Textile Institute, Journal, Transactions,* v. 44, Nov. 1953, p. T499-T533.

Includes diagrams, tables, graphs. 20 ref.

4206* Roller Slip and the Irregularity of Cotton and Rayon-Staple Drawframe Slivers. I. Practical and Experimental. G. Dakin, G. A. R. Foster, and J. Locke. **II. The Nature of Roller Slip and the Theory of Draft Distribution.** G. A. R. Foster. *Textile Institute, Journal, Transactions,* v. 44, Nov. 1953, p. T544-T579.

Includes tables, diagrams, photograph, graphs. 8 ref.

4207* 3-D Printing-Embossing Gives Unusual Effects. George M. Moisson. *Textile World,* v. 103, Dec. 1953, p. 99, 224, 226.

A new process for simultaneous embossing and printing of cellulosic fabrics requires special equipment and special inks. Called Emboprint, method gives fabrics that have a wide range of colors in many unusual combinations.

See also:
3198 (testing instruments for textile industry)

THERMODYNAMICS

4208 Thermodynamic Properties of Technetium and Rhenium Compounds. I. Vapor Pressures of Technetium Heptoxide, Pertechnic Acid and Aqueous Solutions of Pertechnic Acid. II. Heats of Formation of Technetium Heptoxide and Pertechnic Acid, Potential of the Technetium-(IV)-Technetium (VII) Couple, and a Potential Diagram for Technetium. III. Heats of Formation of Rhenium Heptoxide and Trioxide, and a Revised Potential Diagram for Rhenium. IV. Low Temperature Heat Capacity and Thermodynamics of Rhenium. V. Low Temperature Heat Capacity and the Thermodynamics of Potassium Perrhenate and the Perrhenate Ion. Wm. T. Smith, Jr., J. W. Cobble, and G. E. Boyd. *American Chemical Society, Journal,* v. 75, Dec. 5, 1953, p. 5773-5787.

Includes graphs, tables. 60 ref.

4209* A Stable Numerical Solution for Transient Heat Flow. George Leppert. *American Society of Naval Engineers, Journal,* v. 65, Nov. 1953, p. 741-752.

Describes implicit finite difference formula for numerical integration of heat conduction equation. Graphs, diagrams, tables. 7 ref.

4210 Radiant Heat for High Temperatures. Carroll F. Powell. *Battelle Technical Review,* v. 2, Dec. 1953, p. 130-132.

Describes application of infra-red lamps to design of furnaces. Diagram.

4211 The Effect of Thermal Radiation on the Electrical Resistance of Hydrophilic Organic Films. C. D. Niven. *Canadian Journal of Physics,* v. 31, Nov. 1953, p. 1095-1105.

Includes photographs, diagrams. 17 ref.

4212* Heat Transfer in the Film-Condensation of Flowing Steam and Air in Vertical Pipes. (German.) Emil Kirschbaum and K. A. Wetjen. *Chemie-Ingenieur-Technik,* v. 25, no. 10, Oct. 1953, p. 565-568.

Presents a comparison between theory and experiment. Graphs. 6 ref.

4213* Thermodynamics of Evaporation of Liquids. (German.) Karl Kienzle. *Chemie-Ingenieur-Technik,* v. 25, no. 10, Oct. 1953, p. 575-581.

Mollier's i,x-diagram was used for determination of conditions, condition changes, and heat capacities. Graphs. 7 ref.

4214* Thermodynamic Similarity of Liquid Heat Exchangers in Countercurrent. (German.) Werner Matz. *Chemie-Ingenieur- Technik,* v. 25, no. 10, Oct. 1953, p. 581-586.

New thermodynamic characteristic similarity-magnitudes were derived from basic equations for heat exchangers. Relations were determined by geometric analysis. Graphs.

4215* Calculation of the Circulation Heat Exchanger. (German.) Fritz Neumann. *Chemie-Ingenieur-Technik,* v. 25, no. 10, Oct. 1953, p. 587-590.

Equations for medium temperature drop were derived for circulation heat exchangers used as preheater or cooler of liquids. Diagrams, graphs. 3 ref.

4216* A Problem From the Heat Theory and Its Solution by Means of Fourier and Laplace Transformations. (French.) Huguette Delavault. *Comptes rendus,* v. 237, no. 18, Nov. 2, 1953, p. 1067-1068.

Transformations are applied to a solid bounded by two parallel planes.

4217* Intermediate Processes of Performance of Continuously Operating Heat Exchangers. (Russian.) B. N. Deviatov. *Doklady Akademii Nauk SSSR,* v. 90, no. 5, June 11, 1953, p. 771-774.

Presents equations for intermediate process for a change of the initial parameters. 4 ref.

4218* New Method for Studying Heat Emission During Boiling of Liquids. (Russian.) P. G. Poletavkin, V. I. Petrov, L. D. Dodonov, and I. T. Alad'ev. *Doklady Akademii Nauk SSSR,* v. 90, no. 5, June 11, 1953, p. 775-776.

Method is based on use of direct electrical heating of a thin walled tube. Graph.

4219* Calculating Most Economical Thermal Insulation Thickness With a Heat-Loss Graph. *Gas,* v. 29, Dec. 1953, p. 59-60.

Includes graph.

4220 Heat Transfer in Forced Convection Film Boiling. LeRoy A. Bromley, Norman R. LeRoy, and James A. Robbers. *Industrial and Engineering Chemsitry,* v. 45, Dec. 1953, p. 2639-2646.

Includes graphs, tables, diagrams. 7 ref.

4221* Thermal Stress in Pipes. Henry Parkus. *Journal of Applied Mechanics,* v. 20, Dec. 1953, p. 485-488.

An incompressible, hot liquid in steady-state-flow condition is flowing through a long tube, transferring heat to the surrounding walls. Outer surface of the tube is kept at zero temperature. Temperature distribution and thermal stress in the tube are calculated.

4222* Solutions of Heat-Conduction Problem With the Aid of the Inverse Method. F. S. Weinig. *Journal of Applied Mechanics,* v. 20, Dec. 1953, p. 489-496.

Using a known solution of the potential equation for heat conduction it is possible to determine boundaries which fulfill the boundary conditions. Graphs, diagrams.

4223 Applying Electric Heat. Leo F. Spector. *Machine Design,* v. 25, Dec. 1953, p. 142-158.

Discusses basic considerations in analysis, selection, and application of built-in units for effective heat control. Graphs, photographs, tables.

4224 Irreversible Thermodynamics of Thermoelectric Effects in Inhomogeneous, Anistropic Media. Charles A. Domenicali. *Physical Review,* v. 92, ser. 2, Nov. 1953, p. 877-881.

4225* Thermal Repulsion. Mendel T. Gordon. *Research Engineer (Georgia Institute of Technology),* v. 7, July 1953, p. 9-10, 22-24.

In a thermal gradient, small particles suspended in air tend to flow from hotter to cooler regions. Article briefly describes phenomena and tells of some early applications of thermal repulsion in addition to describing the work at Georgia Tech. Graph, photographs. 10 ref.

See also:
2979 (heat transfer in chemical engineering)
3575 (thermal conductivity of solids)

WELDING AND JOINING

5226* Directed Segregation in Cast Iron. (Spanish.) José M. Sistiàga. *Ciencia y técnica de la Soldadura,* v. 111, no. 14, Sept.-Oct. 1953, 4 p.

Discusses identification, origin, and mechanism of segregations. Micrographs.

4227* The Problem of Rupture in Welded Ships. (Spanish.) E. Vollbrecht. *Ciencia y técnica de la Soldadura,* v. 111, no. 14, Sept.-Oct. 1953, 8 p.

Presents some special rules to be observed in construction of welded hulls. Diagrams.

4228* Design for Welded Construction. (Spanish.) F. Koenigsberger. *Ciencia y técnica de la Soldadura,* v. 111, no. 14, Sept.-Oct. 1953, 14 p.

Presents calculation of stresses and load capacity of weldments. Diagrams, tables, graphs.

4229* Using Tungsten Carbide Tools. *Edgar Allen News,* v. 32, Nov. 1953, p. 241-243.

Discusses shapes, grades, selection, and methods of brazing carbide tools. Diagrams. (To be concluded.)

4230* Modern Welding Technique. XX. Miscellaneous Non-Ferrous Alloys. E. T. Gill and Eric N. Simons. *Edgar Allen News,* v. 32, Nov. 1953, p. 253-254.

Discusses methods of welding Ni and Ni alloys, and Mg and Mg alloys. Tables. (To be continued.)

4231* Problems of Fabrication and Erection in All-Welded Multi-Storey Framed Buildings. D. C. C. Dixon. *Engineer,* v. 196, Dec. 4, 1953, p. 749-751.

Compares cost and weight of welded and riveted structures. Tables, diagrams.

4232* Welding Research in British Merchant Shipbuilding. R. B. Shepheard. *Engineering,* v. 176, Nov. 13, 1953, p. 639.

A general discussion of notch properties and tests.

4233* Thermit Welding of Rolling Mill Pinions. John C. Querido, Jr. *Engineering Journal,* v. 36, Nov. 1953, p. 1468-1471.

Discusses thermit welding theory. Describes process of welding new wobbler ends on drive pinions. Lists safety precautions. Photographs, tables.

4234 Fully Automatic Production of Resistance-Welded Wire Mesh. H. Wedl. *Engineers' Digest,* v. 14, Nov. 1953, p. 417-419. (Translated from *Draht (German Ed.),* June, 1953, p. 205-211.)

Describes design and construction of automatic equipment which includes automatic feeds to and from the machine. Graphs, diagrams.

4235* Weldability of Steel. (French.) *Fonderie,* 1953, Oct., no. 93, p. 3639-3652.

Studies were made of weldability of laminated elements, laminated elements with forged or punched pieces, and molded steel. Diagrams, tables, graphs, photographs.

4236* Bronze Welding of Cast Iron. (Spanish.) *Fusion de Metales,* v. 16, no. 5, Nov.-Dec. 1953, p. 6-9.

Discusses principles, advantages, and limitations. Diagrams.

4237* Structural Failures in Welded Ships. *Industry & Welding,* v. 26, Dec. 1953, p. 39-42, 45.

Discusses three basic factors (material, design, and fabrication) involved in prevention of failures in welded structures. Photographs.

4238* Plug-In Sequence Timing Panel Reduces Spotwelding Maintenance Time. *Industry & Welding,* v. 26, Dec. 1953, p. 47-48, 78-79.

Designated a sequence timing panel, this electronic device tells the spotwelder what to do and when to do it. Photographs.

4239* Rapid Transit Track Maintenance Cut 30 Percent by Thermit Welding. Charles Berka. *Industry & Welding,* v. 26, Dec. 1953, p. 50-52, 54.

Includes photographs.

4240* Use Inert Act Welding for Smooth, Even Joints. *Industry & Welding,* v. 26, Dec. 1953, p. 74-76, 78.

Here is another example of how a fabricator—by studying specialized needs of an industry—can select a particular welding process and adapt it to build a product that fits those needs exactly. Photographs.

4241 Jigs and Fixtures Increase Welding Output. Thomas J. Wood. *Iron Age,* v. 172, Dec. 10, 1953, p. 138-141.

Discusses design and use for holding multi-component assemblies. Photographs.

4242 Proper Technique Gives Stainless Good Weldability. Roy E. Solomon. *Iron Age,* v. 172, Dec. 10, 1953, p. 142-144.

Relatively low current, small diameter rod and stringer bead technique produce best welds. Short arc provides better weld zone protection and results in superior corrosion resistance and appearance. Preheating benefits crack-sensitive stainless steels and helps all types during cold weather. Diagram, photographs, table.

4243 Inert Gases Prevent Oxidation, Speed Welding of Magnesium. R. L. Nelson. *Iron Age,* v. 172, Dec. 10, 1953, p. 145-147.

Discusses arc and spot welding of Mg alloys. Includes effect of Al on weldability; tensile strength of welds; comparison of butt, fillet, and lap joints; and comparison of a.c. vs. d.c. current. Photograph, diagram.

4244 Force Fit Improves Brazed Aluminum Joints. Bruce E. Brennan. *Iron Age,* v. 172, Dec. 10, 1953, p. 148-149.

Describes new technique of joining Al tubes which combines force fitting and brazing. Photograph.

4245 Inconel: Which Welding Process Fits Your Job? K. M. Spicer. *Iron Age,* v. 172, Dec. 10, 1953, p. 150-152.

Discusses factors involved in choosing a welding method for a given application. Tabulates minimum mechanical properties to be expected for various methods. Photographs, table.

4246 The Iron Age Welding Rod and Electrode Charts. *Iron Age,* v. 172, Dec. 10, 1953, p. 153-158.

Tabulates suppliers and specifications of rods and electrodes for carbon and stainless steels, Al, Cu, Ni, and Mg alloys.

4247 New Alloys Stop Corrosion in Silver-Brazed Type 430 Joints. J. J. Halbig, L. H. Grenell, and G. H. Sistare. *Iron Age,* v. 172, Dec. 10, 1953, p. 159-163.

Most Ag-brazed joints in type 430 and other chrome-grade stainless steels are susceptible to separation under mildly corrosive conditions. Prevention depends on a Ni-rich layer over area covered by the brazing alloy. Photographs, tables.

4248 Maintenance Welding Keeps Production Moving. W. G. Patton. *Iron Age,* v. 172, Dec. 10, 1953, p. 168-171.

Discusses procedures at Ford Motor Co. River Rouge plant. Describes machine repair and rebuilding shafts and conveyor hooks. Photographs.

4249 Precontrol Aids Resistance Weld Uniformity, Quality. Myron Zucker. *Iron Age,* v. 172, Dec. 10, 1953, p. 172-176.

Discusses planning of setups and coordination of procedures for spot and projection welding. Table.

4250 Joint Effort Promotes Saftey in Welding. N. I. Sax. *Iron Age,* v. 172, Dec. 10, 1953, p. 177-180.

Discusses fire and accident prevention; health protection; and safety standards for equipment. 9 ref.

4251 Copper and Silver Brazing Simplify Joining of Complicated Parts. L. F. Klein. *Materials & Methods,* v. 38, Dec. 1953, p. 108-109.

Reports that combination of proper brazing techniques and simple shapes improves efficiency in production of small, complicated parts and permits use of dissimilar metals. Photographs.

4252* Welding and Efficient Maintenance. C. W. Brett, *Mine & Quarry Engineering*, v. 19, Dec. 1953, p. 461-465.

Modern applications of scientific welding are discussed from standpoint of repair and strengthening of fractured plant. Photographs.

4253* Welding Operations at Fruehauf Trailer. Fred W. Vogel. *Modern Machine Shop*, v. 26, Dec. 1953, p. 136-141.

Describes automatic spot and seam welding equipment, plant layout, and operating procedures. Photographs.

4254 Adhesives Advance. II. Metal-to-Metal Bonding. George Epstein. *Modern Plastics*, v. 31, Dec. 1953, p. 93-96, 202, 205, 206.

Discusses advantages of adhesive joining, theory of adhesion, adhesives, and design considerations. Photographs.

4255* New Electric Welding Methods. (Russian.) V. I. Popov. *Nauka i Zhizn*, v. 20, no. 7, July 1953, p. 5-7.

Discusses automatic welding operations with rods up to 60 mm. in size. Special hydraulic drive secures hydraulic compression of 25 to 30 tons. Application of method increased efficiency seven to eight times. Photographs, diagrams.

4256 Training Pipe Welders. R. D. Berry. *Heating, Piping & Air Conditioning*, v. 25, Dec. 1953, p. 94-96.

Journeymen pipefitters learn welding under program developed through cooperation, for benefit of entire piping industry. Photographs.

4257* Finishes for Soft Soldering Refractory Materials. E. E. Halls. *Product Finishing*, v. 6, Nov. 1953, p. 68-73, 108, 110.

Reviews methods for producing suitable electroplate finishes for soldering on components of refractory materials. Tables.

4258* Over 6,000 Cylinder Heads Reclaimed by Welding. *Railway Locomotives and Cars*, v. 127, Dec. 1953, p. 52-57, 60-61.

Abstract of a committee report of the Master Boiler Makers' Association, Sept. 15, 1953, at the associations' annual meeting at Chicago. Photographs.

4259* Oxyacetylene Welding of Aluminum Materials. (German.) *Schweisstechnik*, v. 7, no. 10, Oct. 1953, p. 109-113.

Describes general procedure, fluxes, gas mixture, flame adjustment, types of joint, and subsequent treatment of welded Al and Al alloys. Tables, diagrams.

4260* Electric Deposition Welding of Rails. II. (German.) Franz Novotny. *Schweisstechnik*, v. 7, no. 10, Oct. 1953, p. 113-117.

Discusses repair of worn parts of street-car rails by electric deposition welding with different types of electrodes. Photographs.

4261* Brazing Cast Aluminum. (German.) *Schweisstechnik*, v. 7, no. 10, Oct. 1953, p. 118-119.

Describes general procedure and its application to the automobile industry.

4262* Investigation of Welding Sheet Cast Iron. (Russian.) A. Z. Blitshtein and S. M. Lashchiver. *Sel'khozmashina*, 1953, no. 11, Nov., p. 19-23.

Describes production and use of cast iron to steel weldments in agricultural machinery. Tables, diagrams, micrographs.

4263 Observations on "Weak Laps" in Tinplate Can Bodies. W. E. Hoare and J. P. Gustin. *Sheet Metal Industries*, v. 30, no. 320, Dec. 1953, p. 1042-1047, 1061.

Principally been concerned with those properties of tinplate itself which may be considered to affect seam performance. However, certain observations on mechanical operations of body-forming and on soldering operation proper are also made. Photographs, tables.

4264* Arc Welding With Melting Electrodes in a Protective Gas Atmosphere. K. V. Lyubavskyi and N. M. Novozhilov. *South African Mining and Engineering Journal*, v. 64, pt. 2, Oct. 31, 1953, p. 317.

Translated from *Avtogennoye Delo*, January 1953, p. 4-8. Discusses principle and advantages of process.

4265 The Welding of Nickel Alloy Steels. I. *Steel Processing*, v. 39, Nov. 1953, p. 573-580, 611.

Discusses arc welding of high-strength low-alloy steels, and low, medium, and high carbon types of nickel steels. Tables, diagrams, photographs. 6 ref.

4266 Welding Rods, a Production Control Problem. *Steel Processing*, v. 39, Nov. 1953, p. 597-599, 610.

Describes facilities and procedures for electrode production at A. O. Smith Co., Lancaster, Penna. Photographs.

4267 The Gun That Shoots Handles. Eleanor Harvill. *Steelways*, v. 9, Dec. 1953, p. 18-19.

New applications and advantages of stud welding are discussed. Photographs.

4268 Printed-Wiring Multiple Soldering Methods. Alvin E. Stones. *Tele-Tech*, v. 12, Dec. 1953, p. 62-64, 160, 163.

Describes modified double-pot and single-pot processes which provide low circuit board reject rate. Discusses selection of materials and prevention of warpage, blistering, and bridging. Photographs, table.

4269* Contact Welding of Roofs of All-Metal Railroad Passenger Cars. (Russian.) V. V. Vershinskii, I. A. Morozov, A. V. Meier, and P. B. Pankratov. *Vestnik Mashinostroeniia*, v. 33, no. 8, Aug. 1953, p. 82-86.

Special equipment is described. Photographs, diagrams.

4270 Copper-Gold Brazing Done Undre Glass. Fred M. Burt. *Welding Engineer*, v. 38, Dec. 1953, p. 60-61.

Describes induction brazing of small assemblies in a hydrogen atmosphere. Photographs.

4271 Repair Welding of Ceramic-Coated Alloys. J. M. Riordan. *Welding Journal*, v. 32, Dec. 1953, p. 1160-1166.

Laboratory tests indicate procedures for field repairs of several alloys for high-temperature aircraft application. Table, photographs, micrographs. 5 ref.

4272 Inert-Tungsten Arc Welding of Stainless Steel Piping. F. J. Pilia. *Welding Journal*, v. 32, Dec. 1953, p. 1167-1174.

With suitable precautions and proper techniques it is possible to produce a surface on the inside of the pipe joint that is smooth and free from obstructions and notches. Photographs, diagrams.

4273 Spot Welding of Aluminum, Aluminum Alloys and Steel. W. J. Wilson. *Welding Journal*, v. 32, Dec. 1953, p. 1175-1180.

Describes results of tests to establish welding techniques and schedule which will produce satisfactory welds with special emphasis on the three variables: force, time, and current. Graphs, photograph, diagram, micrographs.

4274 Quality Control in Spot Welding Aluminum. Floyd H. Matthews. *Welding Journal*, v. 32, Dec. 1953, p. 1181-1194.

Describes equipment, processes, and records. Photographs, charts, check sheets, graphs, tables.

4275 Welded Arch Bridge Over the Rio Blanco River in Mexico. Thomas C. Kavanagh and Camilo Piccone. *Welding Journal*, v. 32, Dec. 1953, p. 1195-1202.

Describes erection of a 250-ft., all-welded, splayed arch bridge of unprecedented design. Photographs, diagram.

4276 Stabilizing Austenitic Chrome-Nickel Weld Metal Against Intergranular Corrosion. Hallock C. Campbell. *Welding Journal*, v. 32, Dec. 1953, p. 577S-584S.

A 22% Cr-10% Ni electrode is proposed as a substitute for usual Cb addition for protection against intergranular attack. Tables, diagram, micrographs, graphs. 4 ref.

4277 Low-Temperature Bend Test Properties of Bead-on-Plate Welds. L. A. Harris, R. B. Matthiesen, and N. M. Newmark. *Welding Journal*, v. 32, Dec. 1953, p. 585S-599S.

Describes tests on welds of low-hydrogen and cellulosic type electrodes with and without pre- and post-heating. Photographs, diagrams, graphs, tables, micrographs. 6 ref.

Welding and Joining

4278 A New Approach to Stitch Welding. *Welding and Metal Fabrication,* v. 21, Dec. 1953, p. 448.

Describes machine which allows speeds as high as 300 welds per minute. Photograph.

4279 Fabricating Switchgear by Welding. *Welding and Metal Fabrication,* v. 21, Dec. 1953, p. 449-456.

Describes shop facilities and procedures. Photographs.

4280 Welded Steel Fireboxes. *Welding and Metal Fabrication,* v. 21, Dec. 1953, p. 457-460.

Describes fabrication of locomotive fireboxes. Photographs.

4281 Electronic Welding Controls. C. R. Bates. *Welding and Metal Fabrication,* v. 21, Dec. 1953, p. 467-468, 474.

Discusses advantages in use of controls. Describes various types including program and slope controls. Diagram.

4282 Welding and Soldering in Metal Fabrication. (German and French.) F. Ulrich. *Zeitschrift für Schweisstechnik,* v. 43, no. 8, Aug. 1953, p. 147-152, 154-157.

Discusses fabrication of useful and artistic metal articles. Photographs, diagram.

4283* Research on Operating Behavior of the Dry Generator ATE 50 N. (German and French.) C. Keel and P. Hartmann. *Zeitschrift für Schweisstechnik,* v. 43, no. 10, Oct. 1953, p. 195-200; no. 11, Nov. 1953, p. 216-218, 220-221.

Discusses causes of disturbances and accidents with acetylene generators. Describes design and operating principles. Tables, diagrams. (To be continued.)

4284* A New Oxyacetylene Welding Torch. New Possibilities for Electric Welding. (German and French.) Rudolf Weber and Max Maier. *Zeitschrift für Schweisstechnik,* v. 43, no. 11, Nov. 1953, p. 209-216.

Discusses causes of flashback. Describes new torch which is insensitive to heat. Photographs, graph.

4285* Weld Spattering in Oxyacetylene and Electric Welding. (German and French.) C. Keel and H. P. Siegenthaler. *Zeitschrift für Schweisstechnik,* v. 43, no. 11, Nov. 1953, p. 222-226.

A study was made on number, shape, and size of spatter particles. Discusses importance of precautions against fire. Diagrams, tables, photographs.

See also:
3128 (corrosion test of welded steel)
3199 (simultaneous operation of several welders)
3810 (silver brazing of cutting tools)

WOOD AND FOREST PRODUCTS

4286 Corrugating With Starch. S. Brown. *Adhesives & Resins,* v. 1, Nov. 1953, p. 250-254.

Describes use of starch as adhesive in manufacture of corrugated board.

4287* The Theory of Grinding Pulp Masses in Rollers. (Russian.) V. G. Markov. *Bumazhnaia Promyshlennost,* v. 28, no. 11, Nov. 1953, p. 8-12.

Discusses problems and influence of mechanical factors of the grinding process. Diagrams.

4288* Determining the Swelling of Cellulose in Water and Alkaline Solutions. (Russian.) N. V. Riukhin and L. N. Ianchenko. *Bumazhnaia Promyshlennost,* v. 28, no. 11, Nov. 1953, p. 13-17.

Investigations showed that character of cellulose swelling in water was changed by increasing drying temperature. Diagrams, graphs, photographs, table. 7 ref.

4289* Production of a New Semifinished Paper Product. (Russian.) N. A. Baranov. *Bumazhnaia Promyshlennost,* v. 28, no. 11, Nov. 1953, p. 17-20.

Use of chlorine cellulose as a basic semi-finished product decreased expenditure for pulp. Lower grade material may be used with this method. Diagram, table.

4290* Production of Brown Wood Pulp From Shavings. (Russian.) N. Ia. Solechnik, A. I. Novosel'skaia, and A. P. Ivanova. *Bumazhnaia Promyshlennost,* v. 28, no. 11, Nov. 1953, p. 25-28.

Brown wood pulp was obtained from fir and aspen shavings, which compare favorably in break and stretch strength with the usual fir pulp masses. Tables, micrographs.

4291 The Chemistry of Extractives From Hardwoods. XIII. Colourless Constituents of *Pterocarpus* Species. F. E. King, C. B. Cotterill, D. H. Godson, L. Jurd, and T. J. King. *Chemical Society, Journal,* 1953, Nov., p. 3693-3697.

4292* Polyethylene Coating on Paper. I. C. W. Patton. *Paper, Film and Foil Converter,* v. 27, Dec. 1953, p. 17-21.

Describes methods of applying in paper conversion.

4293* Ts'ai Lun Was No Chemist; But Now! Robert T. Elias. *Paper Mill News,* v. 76, Dec. 5, 1953, p. 44, 46, 48, 50, 52, 54, 112.

Reviews history and development of paper-making. Includes pulping, bleaching, de-inking, stock additives, sizing, and coating. 117 ref.

4294* The Role of the Hemicelluloses in the Mechanism of Wet Strength. Manuel N. Fineman. *Paper Mill News,* v. 76, Dec. 5, 1953, p. 62, 64, 66, 70, 74.

Presents data which confirm earlier concepts that the alkali-soluble, water-swellable, hemicelluloses are responsible for interfiber bonding and, hence, are a major factor in the strength of paper. Graphs, tables. 35 ref.

4295* What's New in the Kraft Mills? A. P. Schnyder. *Paper Trade Journal,* v. 137, Nov. 27, 1953, p. 14-15.

Assembles latest data for streamlined kraft pulping.

4296* Latest Look at the Industry. W. LeRoy Neubrech. *Paper Trade Journal,* v. 137, Dec. 11, 1953, p. 46-48.

Presents an economic review of paper, pulp, and paper-board industries for year 1953. Graphs.

4297* What's Being Done Toward Getting More Life From Ties on the Santa Fe. *Railway Track and Structures,* v. 49, Dec. 1953, p. 1173-1175.

Abstracts of 4 addresses given at the annual convention of the Railway Tie Association, Atlanta, Ga., October 14-16.

4298 Forest Products Research. Work of the Princes Risborough Laboratory. *Times Review of Industry,* v. 7, new ser., Dec. 1953, p. 10-12.

Describes laboratory facilities and work on wood bending and laminated boat timbers. Photographs.

4299* What's Ahead for Wood as an Industrial Material? J. A. Hall. *Wood and Wood Products,* v. 58, Dec. 1953, p. 20-22, 60-61.

Discusses preservatives, glues, and laminating techniques. Photographs.

Books and Miscellaneous Publications

4300 Bleaching of Pulp. Tappi Monograph Series no. 10. 364 p. 1953. Technical Assoc. of the Pulp and Paper Industry, N. Y. (TS1176 T22b).

Includes "Historical Review", Sidney D. Wells; "Chlorination", R. S. Hatch; "The Alkaline Extraction of Wood Pulps", Alexander Meller; "Hypochlorite Bleaching", and "Special Bleaching Agents", R. S. Hatch; "Bleaching With Chlorine Dioxide", Ward D. Harrison; "The Bleaching of Alkaline Cooked Pulps", J. N. Swartz; "The Bleaching of Sulphite Pulp", K. G. Booth; "Bleaching Semichemical Pulp", F. A. Simmonds and R. M. Kingsbury; "The Bleaching of Rags and Raw Cotton", Lamar A. Moss; "Bleaching of Flax Pulp", M. W. Phelps; "Peroxidesin Pulp Bleaching Processes", Lyman A. Beeman and Joseph S. Reichert; "Equipment and Materials of Construction for Bleaching and Pulp Purification", T. A. Pasco; "The Washing of Pulp", R. S. Hatch; and "Bleaching Control and Testing Methods", M. G. Lyon.

See also:
3284 (water conservation in paper industry)
4059 (mechanization of lumbering)
4061 (management engineering in paper industry)

X-RAY SPECTROMETER

This spectrometer provides X-ray diffraction data on metals, alloys, ceramics, and other crystalline materials. The technician is placing a specimen for diffraction study. X-rays, which are emitted from the tube in the housing to the right of the specimen mount, are diffracted from the slowly revolving specimen and enter the Geiger tube on the left. The equipment is useful for identifying crystalline phases, determining concentration of a phase or phases, studying crystalline particle sizes and perfection, and investigating the constitution and orientation of alloys.

BATTELLE INSTITUTE was founded by the will of Gordon Battelle as a memorial to the Battelle family. The Battelles were among the first settlers of Ohio and were prominent in the development of the state's iron and steel industry.

Gordon Battelle, last of the family line, was impressed with the benefits to be derived from industrial research and left his estate for the building and endowment of an Institute "for the purpose of education . . . the encouragement of research . . . and the making of discoveries and inventions for industry." The Institute began operations in 1929.

As established, Battelle provides, on a not-for-profit basis, the physical plant, equipment, and personnel for conducting research. The great bulk of it is applied research conducted for industry and government.

In keeping with its educational function, the Institute also conducts fundamental or basic research. The results of much of this research are published for the general encouragement of science and industry, and to benefit the public welfare.

Fields of research at Battelle include agriculture and practically all the industrial and engineering sciences.

VOLUME 3, NUMBER 4 APRIL 1954